RAILROAD GAZETTE

SATURDAY, JANUARY 17, 1874.

Miller's Elastic Washer and Nut Lock.

The accompanying illustration represents this device for preventing the nuts of fish-bolts for rail-joints from unscrewing. It consists of a sort of corrugated steel washer, represented in section in fig. 2, where it is shown before the nut is screwed down, and with the corners of the latter placed diagonally across the corrugations. In fig. 3 the nut is drawn down hard. It will be seen that it then bears against the thickened central part of the washer, which is also pressed against the fish-plate. The nut, therefore, has a solid metal bearing; but in order to turn, its corners must depress the corrugations of the washer, which spring back when the sides of the nut are parallel with the corrugations. In this way the latter prevent the nut from turning, and at the same time it can be easily removed by the most inexperienced persons.

It will also be observed that the springs are heavy enough to maintain a constant tension on the bolt, even if the nut is not screwed down hard, or becomes loose in any way.

These washers can be applied to any splice joints now in use without any change of plates or bolts.

It is said that these washers have been extensively introduced and tested, and have worked very satisfactorily. Parties wishing to test them will be furnished with a sufficient quantity to do so by addressing Sweet's Manufacturing Company, Syracuse, New York, who are the owners of the patent and makers of these washers.

CATECHISM OF THE LOCOMOTIVE.

THE FORCES OF AIR AND STEAM.

QUESTION 17. *What is meant by the expansion of steam?*

Answer. In all gases a repulsion is exerted between the various particles, so that any gas, however small in quantity, will always fill the vessel in which it is held. Steam possesses this same property, and if placed in any vessel the particles in endeavoring to separate from each other will exert a force on all its sides. This force we call the steam pressure. To illustrate this we will suppose that the cylinder *A* in fig. 8 is half filled with steam of 30 lbs. pressure. If now the supply of steam is shut off, the steam in the cylinder will expand so as to push the piston upward, but with a somewhat diminishing force, the nature of which we will explain hereafter.

QUESTION 18. *What is meant by the volume of steam?*

Answer. It means the space which the steam occupies.

QUESTION 19. *What is the proportion which exists between the volume and the pressure of steam?*

Answer. If the temperatures remain the same, they are INVERSELY PROPORTIONAL TO EACH OTHER; that is, the one increases in the same proportion as the other diminishes. If we admit steam of 30 lbs. pressure per square inch into the cylinder *A*, fig. 8, and then cut off the supply by closing the cock *C* and allow the steam in the cylinder to expand to double its volume by pushing the piston to the end of the cylinder, the steam pressure will then be only 15 lbs.; if it should expand to three times its volume, its pressure would be only one-third, or 10 lbs. per square inch. If after being thus expanded the piston be pushed down again so as to compress the steam into its original space, its pressure will again be 30 lbs., providing no heat has been lost in any way.

QUESTION 20. *With a cylinder of any given stroke,* how can we determine approximately the pressure of the steam after expansion for any given point of cut-off?†*

Answer. BY MULTIPLYING THE PRESSURE PER SQUARE INCH OF THE STEAM IN THE CYLINDER BEFORE IT IS CUT OFF, BY THE DISTANCE FROM THE BEGINNING OF THE STROKE AT WHICH IT IS CUT OFF, AND DIVIDING THE PRODUCT BY THE WHOLE LENGTH OF THE STROKE. Thus, if we have a cylinder whose piston has a stroke of 24 inches, if we cut off the steam at 8 inches, and have a pressure of 90 lbs. in the cylinder, the calculation is as follows:

90
8

24) 720 (30 lbs. final pressure.
72

0

If we cut off at 10, 12 and 15 inches, the final pressure would be 37½, 50 and 56¼ lbs., respectively.

QUESTION 21. *What is the proportion between the volume of steam and that of the water from which it is formed?*

Answer. At the pressure of the atmosphere, each cubic inch of water will make 1,610 cubic inches of steam. At double that pressure, or 30 lbs. absolute pressure, it will make a little more than half as much, or 838 cubic inches; at four times, or 60 lbs. absolute pressure, 437 cubic inches, or a little more than a fourth as much as at the pressure of the atmosphere.

QUESTION 22. *Why is it that the quantity of steam at high pressures is somewhat greater than in inverse proportion to the pressure?*

Answer. Because the boiling-point of water, as has already been explained, is higher as the pressure increases, and therefore the temperature of the steam produced at such pressure is also higher than at lower pressures; and as all gases are expanded by heat, therefore the volume of steam at the higher pressures is somewhat greater than in inverse proportion to its pressure, on account of being somewhat expanded by its higher temperature. To make this plain, if we take a cubic inch of water and convert it into steam of atmospheric pressure, its volume will be 1,610 times that of the water, and its temperature 212 degrees.‡ If we increase its pressure to double that of the atmosphere, the volume of the steam will be 838 times that of the water and its temperature will be 250.4 degrees. If the volume of the steam were exactly *inversely proportional* to the pressure, the cubic inch of water at double the atmospheric pressure would make only 805 cubic inches of steam; but as the boiling point at that pressure is 38.4 degrees higher, the steam is expanded 33 cubic inches by the increase of its heat due to the higher boiling-point.

The following table will give the pressure, temperature and volume of saturated steam from atmospheric pressure up to 1,000 lbs. per square inch of absolute pressure:

TEMPERATURE AND VOLUME OF STEAM.

Pressure above atmosphere. lbs.p.sq.in.	Relative volume.	Temperature. Fahr.	Pressure above atmosphere. lbs.p.sq.in.	Relative volume.	Temperature. Fahr.
0	1669	213°	75	323	321°
5	1280	228	80	307	324
10	1042	240	85	293	328
15	881	250	90	281	331
20	765	259	95	269	335
25	677	268	100	259	340
30	608	275	105	248	342
35	552	281	110	239	344
40	506	288	115	231	347
45	467	293	120	223	350
50	434	298	125	216	353
55	406	303	145	191	361
60	381	308	165	172	373
65	359	312	185	157	383
70	340	316			

QUESTION 23. *What is meant by the condensation of steam?*

Answer. It is the reconversion of steam into water by cooling it, or depriving it of part of its heat. It has been shown that the temperature of water must be raised to a certain point to generate steam of a given pressure. If the process is reversed, and we deprive the steam of a part of its heat, some of the steam is then at once reconverted into water, or *condensed*, and the pressure of that which remains will be reduced just in proportion as the heat is lost. When the temperature gets below 212 degrees under atmospheric pressure, all the steam will be condensed. As the useful work which steam can do in an engine is due to its pressure, which in turn depends on its temperature, any loss of heat will diminish its effective power. For this reason, all waste of heat from a steam engine should, as far as possible, be prevented.

QUESTION 24. *How is the heat of the steam wasted or lost in an ordinary steam-engine?*

Answer. It is wasted in three ways: first, by *conduction;* second by *convection;* and third, by *radiation.*

Question 25. *What is meant by these three terms?*

Answer. 1. By *conduction* is meant that phenomenon which is manifested when we put one end of a metal bar two or three feet long into the fire and heat it. The heat is then gradually conveyed from one particle of the metal to that next to it until finally the end of the bar farthest from the fire becomes so hot that it cannot be touched. The heat is then said to be *conducted* through the bar. In the same way the metal of the boiler-pipes, cylinders and other parts of the engine become heated on one side, and the heat is thus conveyed to the outside of these parts.

2. The air with which they are surrounded then becomes heated and, being then lighter than the cold air, it rises and is again replaced with air which is not heated. In this way the heat is conveyed away by the air, and this phenomena is therefore called *convection.*

3. If an iron plate be placed in front of an ordinary grate fire three or four feet from it and exposed to the rays of heat from the fire, it will soon become so hot that you cannot bear your hand on it. If you place your hand between the iron plate and the fire you will find that only the side of your hand which is exposed to the fire will become hot, and that somewhat gradually, showing that the air between the plate and the fire is not nearly so hot as the plate soon becomes, and therefore that the heat is not conveyed to the plate by the air between it and the fire, but by the rays from the fire. This phenomenon is called *radiation.* The same thing occurs from any hot body, as for example a coil of steam pipe for heating a room, a steam boiler or cylinder of an engine.

Question 26. *Is there any difference in the conducting and radiating power of different substances?*

Answer. Yes, very great. The difference in the *conducting* power of wood and iron is shown if we place one end of a bar of each in the fire. The wood will be consumed without warming the bar more than a few inches from the fire, whereas the iron will soon become hot two or three feet from the fire. Owing to the difference in the conducting power of cotton and wool, we wear cotton clothing in summer and woolen in winter, because cotton allows the heat of the body to be conducted away from it, whereas woolen cloth prevents to a great degree this loss of heat. For the same reason the vendors of roasted chestnuts on our streets wrap them in a piece of blanket to keep them hot, that is, to keep the heat in, and in Summer we wrap ice in the same way to keep it cold, that is, keep the warmth of the air out. The wool, being a very bad conductor of heat, simply prevents the heat from being transfered from the inside to the outside and *vice versa.* It is for this reason that steam boilers, pipes and cylinders are nearly always covered with wood, and sometimes with felt.

The difference in the *radiating* power of various substances can be shown if we take a large thermometer and heat it up to a temperature of boiling water. If this thermometer is hung up in a room having the temperature of melting ice, it will lose heat in two ways, first by heating the air which surrounds it, that is by *convection,* and also by *radiation.* In order to confine ourselves to the latter process, we will suppose the chamber is a vacuum. We will, however, first cover the bulb of the thermometer with a thin coating of polished silver, and then ascertain how much heat it radiates in a minute. Next let the bulb be coated with lamp-black, the same experiment being repeated; that is to say, the thermometer at the boiling point is allowed to cool for one minute in a vacuum chamber at the freezing point. It will be found that the thermometer loses much more in a minute when coated with lamp-black, than it did when coated with silver, showing that much more heat is radiated from a surface covered with lamp-black than from polished silver. Generally it may be stated that polished metals radiate much less heat than surfaces which are not polished.‖ For this reason, as well as for ornament, locomotive and other boilers and cylinders are usually covered with Russia iron or polished brass.

Fig. 1.

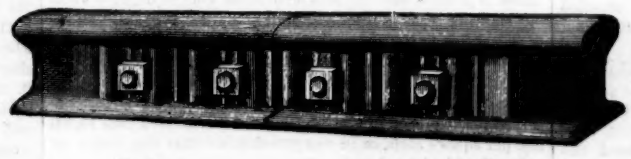


Fig. 2.
NOT SCREWED DOWN.

Fig. 3.
SCREWED DOWN AND NUT LOCKED.

MILLER'S ELASTIC WASHER AND NUT LOCK FOR RAILROAD FISH JOINTS.

* The *stroke* of a piston is the distance it moves in the cylinder, and in ordinary engines is always twice the length of the crank measured from center to center of the shaft and crank-pin.

† The steam is said to be *cut-off* when the steam-port by which steam is admitted to the cylinder is closed by the valve.

‡ More accurately, 213.1 degrees, if we call the atmospheric pressure 15 lbs., as we have done.

‖ The above experiment is copied from Balfour Stewart's very excellent little book, "Lessons in Elementary Physics," of which, and the same author's "Elementary Treatise on Heat," the writer has made frequent use.

Transportation in Congress.

In the House on the 7th:

Mr. Kasson, of Iowa, introduced a bill to establish certain regulations of commerce conducted on railroads among the several States with foreign countries, and to regulate railroads with respect thereto.

In the Senate on the 12th:

Mr. Ingalls, of Kansas, introduced a bill in reference to carrying freight and passengers on the Union Pacific Railroad and its branches. It provides that all freight and passenger traffic between Kansas City and Leavenworth, or any point on the line of the Kansas Pacific and Denver Pacific Railway, via Cheyenne, Wyoming Territory, to Ogden, or any point on the line of the Union Pacific Railroad, or points beyond its terminus, shall be carried by the said companies jointly at the same rates as are charged on similar traffic between Omaha and like points; but the Union Pacific Company shall not be required to receive upon the said traffic a less sum than it would be entitled to receive upon similar traffic over its own road when pro rated to and from Omaha. Suits may be brought and sustained in any United States Court in which any portion of either of said roads is situated for treble the amount of damages and loss occasioned by a refusal to comply with the foregoing provisions. Referred to the Committee on Transportation.

In the House on the 12th, Mr. Hurlburt, of Illinois, introduced a bill chartering a double-track railroad from tidewater on the Atlantic to the Missouri River, and to limit the freight charges thereon. Referred to the Committee on Railroads and Canals.

Mr. Luttrel, of California, offered a resolution for an investigation of the relations of the Central Pacific with the Contract and Finance Company, providing for the appointment of a committee of seven with power to send for persons and papers. Referred to the Committee on Pacific Railroads.

Mr. Woodworth, of Ohio, introduced a bill to establish a Bureau of Transportation, to regulate the management of transportation companies engaged in carrying between the States. It would consist of one Commissioner and four Assistant Commissioners, who should fix rates and enforce the laws relating to transportation.

PERSONAL.

—Mr. Jerome B. Pendleton, Superintendent of Machinery of the Seaboard & Roanoke Railroad, died in Portsmouth, Va., January 6. Mr. Pendleton was in the 47th year of his age and had been connected with the Seaboard & Roanoke road since 1847, and Superintendent of Machinery since 1852. He was a prominent member of the Master Mechanics' Association and was its Vice-President in 1872.

—Mr. James Parker, who died in Springfield, Mass., January 9, was one of the first conductors on the Western (now the Boston & Albany) Railroad, having run the first train through from Worcester to Springfield in 1839. He was conductor on the road until four years ago, when he was appointed Superintendent of the New York & Boston through trains, which position he held at the time of his death.

—Mr. T. B. Burnett has resigned his position as Assistant Superintendent of the St. Paul & Sioux City and Sioux City & St. Paul roads, and has become partner in a law firm at St. Louis.

—Mr. J. M. Ranney, General Freight Agent of the Chicago, Danville & Vincennes Railroad, was married in Chicago Christmas eve to Miss Maria E. Garrity.

Contributions.

The Bridge Across the Mississippi River at Louisiana, Mo.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The Chicago & Alton Railroad has a western connection by way of its Jacksonville Branch, the Roodhouse & Louisiana Railroad and the Louisiana & Missouri River Railroad to Mexico on the St. Louis, Kansas City & Northern Railway, thence to Kansas City over the latter route. It also has a branch from Mexico, Mo., to Jefferson.

Since the construction of the two railroads east and west of Louisiana, about two years ago, a railroad transfer boat has made the connection good at this point when the stage of water and the ice would permit.

Last winter the river was closed by ice for several months. Early in the spring the railroad company resolved to build a bridge and insure a sure connection at all seasons, which the steadily increasing traffic demanded. Before the ice broke up surveys were made on which was based a preliminary estimate of the cost of the work. When the river opened more extended examinations were made, embracing a thorough hydrographical survey for two miles above and below the proposed location of the bridge. The necessary maps and plans were made and submitted to the Secretary of War for his approval, which was granted after considerable delay. The work of construction was commenced on the 30th day of June, 1873.

The general features of the river and surrounding country are a sandy bed, a bold rock bluff on the west near the river, a wide alluvial bottom on the east, rock appearing on the surface at the west shore, and a gradual slope to the east shore, where it is one hundred feet below the river bed. The width of the river on the bridge line is 3,900 feet.

The sand bars above the bridge line exist to such an extent and with such irregularities that cross currents and devious channels make navigation very difficult at a low-water stage. At the bridge line and for 500 yards above and below the channel is at right-angles to the line of the bridge, but with the river spread over so wide a space and the bars constantly changing above the bridge, it was feared that, if the bridge spanned the river from bank to bank, so much water-way in width would allow the channel to change and possibly leave the draw.

The importance of making the connection before winter, the general features of the river and the special Act of Congress in regard to the dimensions of the draw compelled the accomplishment of three things, hitherto not attempted on the Upper Mississippi—in this vicinity at least.

1*st*. To hold the channel in place by confining and directing it.

2*d*. To construct and operate a draw 60 feet longer than any in the world.

3*d*. To complete the bridge before the ice closed the river.

Bridges across the Upper Mississippi have become so numerous, the manner of sinking foundations so nearly the same in each case, the style of the superstructure so common, and so much has been said and written about these matters, that we will only make a brief mention of the dimensions and quantities of the work, with a short description of the structures, and then proceed more at length to speak of the three subjects alluded to above.

The dimensions in length are as follows:

The west approach is 2,800 feet; Span 1, 160 feet; Spans 2 and 3 (draw spans), 222 feet each; Span 4, 255 feet; Span 5, 223 feet; Spans 6, 7, 8, 9, 10 and 11, 160 feet each. The east approach, 2,200 feet.

The piers in general design are very similar to those at Hannibal and Quincy. The west abutment has curved wing walls, with steps and parapet walls of hammer-dressed stone. The draw-rest piers under the upper coping are 24 feet 7 inches long by 4⅓ feet wide, with a lower coping of the same width to receive the ends of the draw span. The pivot pier is large enough to receive a turntable 36 feet in diameter from center to center of drum. The sides of the pier are circular, with a radius whose center is 10 feet each way beyond the center of the piers.

The piers which support the long spans are 22 feet 8 inches long under the coping and 8 feet wide.

The piers which support the short spans are 21 feet long under the coping and 8 feet wide.

The ordinary piers have an ice-breaker of stone extending from the stepping course to a point 10 feet below high water. The batter of its face is 6 inches to 1 foot. The sides and ends of the pier have a batter of ⅛ inch to 1 foot to the belt course, which is at high-water mark, and above this a batter of ¼ inch to 1 foot. The startings are rectangular. The up-stream starting with the belt course and coping is hammer-dressed.

The stone is the ordinary limestone found in this vicinity, and will compare very favorably with any on the river. About 1,500 cubic yards were obtained from the quarries of Messrs. Munson & Turner, at Millville and Seehorn, on the line of the Quincy, Alton & St. Louis Railroad, a few miles below Quincy. About 1,200 cubic yards were taken from a quarry a mile below the bridge. These stone are a very pure limestone, but impregnated with iron, which gives them a yellow color. They are quite soft when first quarried, but become hard when exposed to the air.

All the piers are on a pile foundation. At the west abutment the piles were driven through a hard gravel bar 13 feet to the rock, the excavation having first been made one foot below low-water mark. They were sawed off by a steam saw. A rotary pump was then used to take the water out of the excavation. Concrete was laid around and over the piles, and on this foundation the masonry was built.

With all the other piers the piles were sawed off level with the river bed, and riprap carefully placed around them by a diver. The masonry was then lowered by guide piles in a water-tight caisson, built on a platform of several courses of 12x12 oak timber placed six inches apart and securely held together by a 20-inch drift-bolt at each crossing, the timber in every alternate course being placed at right angles to that above and below it. The flooring of the platform was two courses of 2-inch pine plank jointed, caulked and pitched. The piles of the two draw-rest piers and the pivot pier were driven to the rocks. The piles of the remaining piers were driven until a blow from a 2,500-pound hammer falling 25 feet would not drive the pile more than ⅛ inch. The average depth driven of all the piles was 20½ feet.

Above and below the pivot pier draw rests were sunken upon an island of riprap, leveled carefully by a diver. The crib below low water was made of oak timber, 12x12 and 10x10, framed together and dritt-bolted. The sides above low water were made of 4x10 white oak plank drift-bolted together, tied through the structure by 2-inch oak plank, and adzed to the several batters required. The whole structure was then filled with riprap. One hundred feet above the upper draw-rest an ice-breaker was built after the same general style of the draw-rests, except that it was smaller, had a cutting edge protected with iron plating, and was built only to high water.

Between the ice-breaker and draw-rest are four pile clusters to serve as fenders for boats.

A solid structure was built above the west draw-rest pier of piles, timber and planks and filled with brush and riprap. It is furnished with pile fenders and mooring rings for steamboats.

Between the pivot pier and draw-rests are white pine floats composed of four courses in height and two in thickness of 12x12 sticks united by diagonal bracing and ties and supplied by three fenders on each side for steamboats.

All the structures and that part of the embankment below high water were well protected with riprap.

The *superstructure* is of wrought iron throughout, except a few parts which were of necessity made of cast iron.

The long spans and draw span are a modification of the Pratt truss with a double intersection system of ties, pin connection, square bars for the lower chord, double posts on fixed spans, no adjustment to main ties, counters furnished with turnbuckles.

The short spans are after the same style of truss, but a single intersection system with single posts, flat instead of square bars for the lower chord, and posts swelled in the center.

The iron throughout was tested at the bridge works, and in every respect comes fully up to the specifications, which demand in general that the iron shall bend cold 90 degrees without showing signs of fracture, shall sustain a breaking strain of 50,000 lbs. to the square inch, shall have a limit of elasticity of 25,000 lbs., shall elongate at final rupture 12 per cent. of its original length, and shall when finished be tested with a strain of 15,000 lbs. per square inch. The parts are so proportioned that the iron in tension shall not be strained over 10,000 lbs. per square inch, or in compression so that the factor of safety shall be less than 5.

There was one span, a Post truss of 140 feet, built on the west approach over a creek.

The track on the bridge is a packed chord of white-pine stringers 8x16 in., with side stringers 6x16 in., and on these 6x8 in. oak ties 14 feet long on the fixed spans and 16 feet long on the draw, spaced 20 inches from center to center.

The quantities in the work are as follows: Piles in foundations, 926, 18,100 linear feet; timber and plank in foundation, 320,000 feet B. M.; timber and plank in draw rests and ice-breaker, 158,000 feet B. M.; piles in crib above rest-pier, 92, 3,466 linear feet; timber and plank in same, 90,000 feet B. M.; floats, 100,000 feet B. M. Iron in all structures, 90,000 lbs.; masonry, 5,750 cubic yards, including second-class masonry in bridges and culverts on the west approach; riprap, 40,000 cubic yards; earth em bankment, 162,000 cubic yards. *Cost of construction about* $700,000.

We will now speak more in detail of the three subjects previously alluded to:

1st. Controlling the channel.

This was done by building the embankments into the river on the bridge line to confine the current and by a deflecting dyke above to direct it.

At the bridge line the embankment on the east side was extended into the river 1,260 feet, and on the west side 550 feet. Those embankments have already deepened the waterway through the bridge.

A dyke starting out from the east side 4,500 feet above the bridge and at right angles to the shore crosses a deep channel and follows along a sand bar on a 2-degree curve for 2,500 feet. This dyke is built of piling, brush and riprap. The base is from 40 feet to 60 feet wide. The quantities are: 10,000 linear feet of piling, 3,000 cords of brush, and 5,000 cubic yards of riprap: the cost is about $30,000.

When the water is at the top of this dyke, which is built three feet above low water, there is a difference of level between the water above and below the dyke next the stone of 18 inches.

The results obtained thus far are a quickening of the current between the dyke and the levee at Louisiana, the washing away of the bar below the dykes, and a deposit to some extent behind the dyke.

The changes on the Upper Mississippi are necessarily slow, but it is confidently expected that this dyke, together with the embankment at the bridge line, will greatly improve the channel between the levee and the bridge, and hold it in its proper place through the draw.

The second peculiar feature belonging to this bridge is the great length of the draw, which is 444 feet. Its other dimensions are 18 feet between centers of trusses, 28 feet at the arch between centers of top and bottom chords, 39 feet 8 inches at center of truss; weight of truss and track, 750,000 lbs., which is supported by a turn table whose diameter is 36 feet from center to center of drum; total height 10 feet 1¾ inches, height of drum 6 feet 6⅛ inches. The drum moves on 48 cast-iron wheels, whose surface, with those of the lower track and under side of the drum, is planed by a machine constructed for the purpose at considerable expense. The wheels are connected by radial rods with a spider working about the center cone. Above these wheels and under the six bearing points of the load, and against the lower segments of the drum, are cylindrical cast struts 8⅛ inches in diameter. Between these struts and over each wheel are wrought struts. These all rest against the lower segment at one end, and at the other against a spider working about the center cone.

The suspension rods which hold up the drum and by which it is adjusted in the wheels are in pairs under the six bearing points, and of 3⅛ inch round iron. The rod next to them is 1⅞ inch iron, and the next 1¼ inch. They then increase in size till they reach the next bearing point. These suspension rods pass through a heavy crown casting weighing 9,000 pounds, and turning on the centre cone by means of a centre-pin nine inches in diameter.

The posts of the truss are made of two channel beams connected by an I beam. At the centre there are heavy leaning posts that carry the weight to the side of the turntable. The top chord for five panels is made of square chord bars like the lower chords of the fixed spans. The remainder of the top chord and all of the bottom chord are made of two channel beams strengthened by plates. At the height of 20 feet above the rail is a system of bracing with longitudinal and lateral struts between posts and diagonal bracing which serves to stiffen the posts and the whole truss.

The tie rods and counter ties are furnished with turn buckles.

One man can move the draw with an ordinary hand-gearing, but it is worked by a double-cylinder engine. At the ends of the draw are cams for raising the ends of the truss on the draw-rest pier. These cams are worked by the engine on the turntable.

The third peculiar feature of the work is the unusually short time consumed in the construction of the bridge. When on the 30th day of June last the instructions were given to have the bridge ready for business by Christmas, but few believed it possible to do it; but by planning the work to allow a margin for delays, by putting on a force commensurate with the work and the time in which it was to be done, with favorable weather and reliable and energetic contractors, the work has been done on time. The bridge was formally opened on the 24th of December, and since then all trains have crossed on the bridge.

The President of the bridge and railroad companies, to whose energy, forethought and financial ability the largest share of the honor connected with the work is due, is Mr. T. B. Blackstone, of Chicago. The Chief Engineer was E. L. Corthell; his First Assistant, H. W. Parkhurst; and his Second Assistant, Henry Draper. The contractors for the substructure and approaches were Reynolds & Saulpaugh. The long spans and draw were built by the Kellogg Bridge Company, of Buffalo, N. Y., the short spans by the Keystone Bridge Company, of Pittsburgh, Pa., and the 140-feet span by the American Bridge Company, of Chicago.

Ticket Commissions.

[Conversation between an American railroad man and an English railway director, reported for the RAILROAD GAZETTE by THE HINDOO.]

(Continued from page 2.)

E. D.—I am told that some of you practice other methods besides payment of commissions, in order to make secret "cuts." I allude particularly to the irregular issue of coupon tickets. When in New York, on my way here, I heard that agents of one of the trunk lines were selling in New York as tickets to Chicago, coupons of tickets "Boston to Chicago," with the Boston to New York part taken off; that the Boston stamp was affixed in the New York office and the ticket sold for less than the agreed fare from New York to Chicago.

A.—Something like that is done in Cincinnati also. But I am not prepared to say that the practice has been authorized by the chief officers of any of our railroads. It is more than likely that these are tricks of subordinates, for which the managers are no more responsible than they are for the collusion between conductors and ticket-sellers when the former return to the latter unpunched tickets which they take up on the trains, and divide the profits derived from repeated sales of the same ticket. At every competing point you will find several "union ticket offices" where you can buy tickets over any road; these are technically known as scalping offices, and are kept by men who deal in fractional tickets. As a sample of their business, I will give you some facts related by a friend with whom I traveled a few days ago. He is a Detroit merchant who is in the habit of visiting New York occasionally. Being anxious to save money on true business principles, he manages thus wise: In New York he buys from a wholesale dry-goods firm, who keep a ticket office for the convenience of their customers, a ticket New York-to-Saint Louis for $25, uses the coupon New York-to-Detroit, and on arriving at the latter place sells the balance of the ticket to a scalping office for $14, so that his journey has cost him only $11, or $5 less than the local fare from New York to Detroit, which is $16. Now the local fare from Detroit to Chicago is $8.50, and Chicago to Saint Louis $11, total $19.50, value of the coupons for which the ticket dealer paid the merchant only $14, leaving him a margin of $5.50 to work on.

E. D.—By such operations wide-awake local passengers manage to travel at a small advance on through rates, which are always considerably less than the local ones, is it not so?

A.—Yes; but these ticket dealers often sell the coupons for full local fare to persons who do not know that their offices are not authorized by the companies.

E. D.—This profit of course comes out of the revenue of the companies, and is an addition to the commission tax. Has this loss been estimated?

A.—I do not think it has. I do not know how it could be estimated. The amount lost is not what any company has paid out, but what they would have received if all local passengers had been compelled to pay local fares. The difference between the local fare and the division of the through fare is on some roads very great. For instance, the Chicago & Alton receives only $5 on each ticket sold St. Louis-to-New York, while the local fare is $11.

E. D.—Why do you not make your through tickets good for continuous journey only, then the coupons would be good only for a limited time and so be useless to any one but the purchaser? Such an arrangement would effectually stop speculation in coupons and add a respectable sum to the railway revenues.

A.—The coupon ticket is one of the fruits of competition, and is offered as an inducement to take a circuitous route. For instance, a person intending to go from St. Louis to New York would, other circumstances being equal, choose the shortest line and go by the Pan Handle, but the Chicago lines step in and say: "We will sell you a ticket for the same price and give you the privilege of stepping off at Chicago, a city worth seeing; then you may stay a day or two in Canada, visit the falls, inspect the wondrous elevator at Buffalo, and so make your trip a pleasure tour." In fact, through tickets have become unlimited excursion tickets. The courts have decided in more than one case that when a passenger commences his journey the railroad company has the right to insist on his completing it or forfeiting his ticket. The railroad companies also have a right to limit their common law liability by special contract for consideration. The regular fare is of course the sum of the local fares; no court or law could compel a less one. Therefore if railroad companies agree to book over each other and place a through ticket on sale at a reduction on the sum of the local fares, that reduction is sufficient consideration to warrant a special contract, if any is necessary, limiting the use of the ticket. Through tickets good only for a continuous journey, with a reduction for return, should be the cheapest offered. Excursion tickets might be offered at a slight advance, good within a limited time from date of sale and good only for a limited time at intermediate places.

In the conduct of our passenger business there is unfortunately a trait of recklessness and demoralization not creditable to our managers; but, as I said before, "competition" is taken as an all-sufficient excuse for any folly that a subordinate officer may advise or a manager sanction.

E. D.—We, in England, have gone through all this, and, having discovered the error of our ways, have reformed, as you will too, in time. The laws that control these matters are unalterable and are the same on both sides of the ocean. Our system is in a more advanced stage than yours, that is all. As the trunk of the railway system approached completion, the spirit of rivalry became rampant. Enormous sums of money were wasted in parliamentary contests, and great companies fought with one another session after session for the privilege of constructing additional portions of railway which it was frequently not to their advantage to undertake. Impelled partly by territorial ambition and partly by apprehension of invasion or competition, they damaged themselves not only by direct expenditure before Parliament and for extensions, branches and block lines, but also by too eagerly grasping at quasi-independent lines, constructed for the purpose by ingenious promoters; and they vied with each other as to the terms on which such lines should be possessed. By the follies of the original companies and by the action of financing promoters, more than by legitimate enterprise, the railway system thus extended with unhealthy rapidity, until the inevitable result was at length experienced. Extravagance led to financial embarrassment; concealment was necessary to the maintenance of credit; capital accounts were unduly increased; revenue expenses were either not sufficiently incurred or not properly charged; accounts were falsified; the balance sheet was made to suit the dividend, in place of profits (or losses) being calculated from its figures; and public investigations revealed to some extent the practices which had prevailed.

The difficulties thus incurred led to depression and temporarily affected the companies which were in a sound as well as those which were in an unsound condition; and it was only the extraordinary elasticity and progressive increase of railway traffic that enabled some of the former to return more readily, and others more gradually, to a condition of prosperity; while certain companies which had previously been really or apparently wealthy and prosperous, have not yet surmounted and never can entirely recover from the difficulties into which defective or vicious management so deeply plunged them.* Our panic of 1865 led to the failure of many schemes then projected, and after it the construction of new lines almost ceased. A few, undertaken by wealthy companies, were finished, and although of late there have been signs of a returning confidence, it is apparent that some time must yet elapse before railway construction can proceed as rapidly as it did before 1865. Existing railway companies have abandoned the policy of reckless competition, and seek to strengthen their positions by amalgamations.

A.—Our history might be written in the very same words, excepting that we have not yet abandoned the policy of reckless competition. Confined within narrow limits, in England, the opponents soon met hand to hand; here there is yet plenty of room and a future to struggle for which baffles all human calculation; but the future is not the present, and while our hopes and aspirations revel in the future, we poor mortals are compelled to seek our sustenance in the present. The railroad facilities already supplied are sufficient if not more than enough for the present; in endeavoring to provide more for the sake of controlling the future, those companies which have now sufficient to make them prosperous may meet with great disaster. The great competitors are really few, and sooner or later must cease to war on each other. The stranger who enquires why these stupid wars are waged; why such demoralization continues; why such unwise counsels prevail, is told that want of faith on the part of railroad men in each other is the cause; that these quarrels have been fomented by the selfishness of one management and the dishonorable character of another, now, thank goodness, passed away; that personal bitterness has prevented the adoption of measures pointed out by wisdom; that railroad men cannot keep any agreement; that there is no such sentiment as personal honor among them. Astonished by such depravity he asks: "Who then are these men so faithless and so dishonorable, and is told, J. Edgar Thomson, Peter H. Watson, John W. Garrett, Cornelius Vanderbilt and Richard Potter; these five men are directly responsible for the demoralization that exists and for the wasteful management of all the railroads of the country." Is it possible that these gentlemen are devoid of honor? far be it for me to say so, even to think so; I cannot believe that any one of them who has set his hand to an agreement believing it to be a wise one and presumedly he would not sign it unless it were a wise one; I cannot believe, I repeat, that having signed it he would violate it; and yet, solemn compacts have been violated you will say.

True, but let us remember that for a long time the Erie was controlled by a shameless management which did not even profess to be honest, and that therefore any arrangement with it would only last so long as it chose and no longer. Let us also remember that confusion and rampant corruption are advantageous to a very large class of subordinates attracted to the service by the chances of stealing. Every reform having for its object the legitimate application of revenue meets with the strongest opposition of these gentlemen, and discipline has hitherto been so lax, that the subordinates have been allowed larger powers or either have arrogated larger powers than they should have. Every agreement made by the high contracting parties is violated by some subordinate, who, if brought to task, has a plausible tale of self-defence. Hearsay evidence is accepted as proof, mountains are made out of molehills; reprisals begin and very soon the last state is worse than the first, and it becomes impossible to find out who was the first to violate the agreement which has now become a dead letter. The subordinate almost invariably has personal ends in view. His motto is, "after me the deluge;" hence honest, his zeal frequently outruns his discretion. When an agreement is entered into between railroad companies, the great object to be provided against is the indiscretion, or something worse, of subordinates, who would not be sorry to see the old state of chaos restored. The Western managers have shown themselves eager for reform, but without the co-operation of the Eastern Trunk lines nothing permanent can be accomplished.

*Vide Capt. Tyler's report to the Board of Trade (England), dated 2d November, 1871.

OLD AND NEW ROADS.

Ware River.

At a meeting held in Palmer, Mass., January 5, the stockholders of this company voted to lease the road to the Boston & Albany Railroad Company, and the stockholders of the latter company voted to accept the lease in Boston, January 6. The lease is for 999 years and the lessee agrees to pay 5 per cent. on the capital stock the first year and a half per cent. more each year until 7 per cent. is reached, and that rate permanently thereafter. The lessee is also to bear the cost of completing the road. The line is 49 miles long, from the Boston & Albany at Palmer, north by east to the Cheshire at Winchendon. The capital stock is $750,000, so that the rent at 7 per cent. will be $52,500. The cost of completing the line is about $300,000, adding interest on which will bring the annual cost to the lessee up to $73,500, or $1,500 per mile. The road has just been opened through to Winchendon, 18 miles of it, from Palmer to Gilbertville, having been completed some time, and operated by the New London Northern.

Frankford & Breakwater.

The contract for the construction of this road has been awarded to Amos Smith & Co., of Pittsville, Pa., for $270,000, $2,000 in State bonds, $30,000 in individual subscriptions and the balance in stock. The road is about 14 miles long, from Frankford, Del., northward to Georgetown.

Winona & St. Peter.

A number of the grain elevators at stations along the line, which were owned by the company, have been sold to private parties, and the rest are to be sold as soon as possible. The company offers to give land to any party wishing to build an elevator or warehouse at any station.

New York, Providence & Boston.

The company has determined to unite its common and preferred stock in one common stock. There are only two shares of old common stock outstanding.

Hoosac Tunnel Line.

Governor Washburn in his message to the Massachusetts Legislature discusses the question of the utilization of this tunnel, and concludes that it would seem preferable to lease the connecting roads rather than to buy them because it would be easier to relet than to sell. The State should retain the ownership of the Tunnel, and the wisest solution now possible may be to place the interest of the State in a Board of Trustees.

Chicago & Illinois Southern.

Charges of extortion and unjust discrimination have been brought against the lessee of this road, the Paris & Decatur Company. The President of the latter company denies these charges, which are to be investigated by the board of Railroad Commissioners.

The Farmers' Loan and Trust Company of New York, trustee under the first mortgage, has made application for a decree of foreclosure and for the appointment of a receiver, interest on the bonds being unpaid. The Court granted the application, and appointed E. B. McClure, Receiver.

North Carolina.

North Carolina papers state that the board of directors of the North Carolina Railroad Company is unanimously of the opinion that the consolidation act recently passed by the Legislature cannot be accepted by the company. Many amendments were made by members opposed to the measure, and in its present form it is not for the interest of the company to accept it.

Atlanta & Richmond Air Line.

A meeting of the bondholders, whose coupons due January 1 were not paid, was held in New York January 8. A committee was appointed to look after the interests of the bondholders, and to take steps for foreclosing the mortgage in case the interest is not paid.

Oil Producers'.

The formal decree of dissolution of this company was issued by the Court of Common Pleas of Crawford County, Pa., December 31, and the officers of the company were ordered to wind up its affairs as trustees and file the necessary vouchers with the Court.

St. Louis & St. Joseph.

A meeting of the first-mortgage bondholders was held in New York, January 8, at which nearly three-quarters of the whole amount ($1,000,000) of the bonds was represented. A committee, consisting of S. A. Chase, W. K. Mead, N. E. Gouldy, J. A. Gillson and C. W. Hassler, was appointed to act in the interest of the bondholders and to bid in the road at the approaching foreclosure sale, which is advertised to take place January 15.

St. Louis & Iron Mountain.

A new round-house of wood with 10 stalls has just been completed at Carondelet. A brick engine house at De Soto is also just finished. The latter holds 16 engines and is a section of a full circle, which, when completed, will have sixty stalls.

Vermont & Massachusetts.

At the special meeting held January 6, to consider the lease of the road to the Fitchburg Railroad Company, there was much discussion and many objections were presented. The stockholders, however, finally voted to confirm the lease by a vote of 18,619 shares against 850. The stockholders of the Fitchburg Company have already confirmed the lease, the terms of which have been before noted.

Southern Maryland.

A contract has been let to Colonel Allabach for laying the rails and ballasting the road from the crossing of the Baltimore and Potomac at Brandywine, Md., to the southeastern terminus in St. Mary's County.

Boston, Barre & Gardner.

Regular trains have commenced running over the new extension from Gardner, Mass., to Winchendon.

Nashua, Acton & Boston.

A petition in bankruptcy has been filed against this company in the United States District Court at Manchester, N. H., by the Taunton Car Company. An order has been granted, returnable January 20.

Springfield & Illinois Southeastern.

A petition has been filed in the United States Circuit Court at Springfield, Ill., by representatives of the bondholders for the appointment of a receiver, the last two coupons on the first-mortage bonds being unpaid.

It is stated that some of the small holders of bonds have obtained judgment against the company and are levying on the rolling stock. The motion for a Receiver is made on behalf of some large bondholders, and is intended to stop this action.

The Court decided, January 10, to grant the application for a Receiver, and appointed Charles A. Beecher and Alexander Starne, of Springfield, Ill., and H. M. Bloodgood, of New York, Receivers. All three are directors of the company, and Mr. Beecher is also Vice-President and Mr. Bloodgood, Treasurer. The latter is said to be a large holder of the bonds.

East Broad Top.

This road is completed and in operation from Mt. Union, on the Pennsylvania Railroad, 191 miles west of Philadelphia, southward down the Aughwick Valley to Orbisonia, a distance of 10 miles. The balance of the road from Orbisonia west by south to Broad Top City, about 25 miles, is under construction. The road is of 3-feet gauge and is built mainly to carry coal from the Broad Top region to iron furnaces along the line, and to take the products of those furnaces to the Pennsylvania road.

Pennsylvania Freight Tariffs.

A meeting of the General Freight Agents of a number o Pennsylvania roads was held in Bethlehem, Pa., January 6, to consider the revision of freight tariffs and the adjustment of classes. Ellis Clark, of the North Pennsylvania, was Chairman, and J. L. Bell, of the Philadelphia & Reading, Secretary. The meeting was private, but it is understood that the working of the railroad sections of the new Pennsylvania constitution came up for discussion. The Pennsylvania Railroad was not represented.

Baltimore & Ohio.

Proceedings in ejectment have been commenced by the United States to recover possession of the property at Harper's Ferry now used for the shops and tracks of this road.

The bridge over the Baltimore & Potomac road on the branch to East Alexandria is completed and track-laying on that branch has been commenced. At Alexandria, Va., the building of the ferry landing and the dredging out of the slip are progressing.

Des Moines Valley.

In the Circuit Court at Des Moines, Ia., January 7, two executions against the road were ordered by the court. A special execution was ordered to issue to the Sheriffs of Lee and Van Buren counties to sell certain property. The petition of intervention, filed for a time for the Receiver to file his accounts, was extended to February 1.

At a meeting of the second-mortgage bondholders in New York, January 8, a committee was appointed to prepare a plan of reorganization for a company to operate the northern section of the road (Des Moines to Fort Dodge) which was purchased and is now held on behalf of the second-mortgage bondholders.

Elizabethtown & Paducah.

The Louisville Extension of this line is rapidly approaching completion. There remains unfinished at this date only two miles of grading, one iron trestle, the bridge over Salt River, and 16 miles of track, all of which will be done by February 15. The company has purchased 20 acres of land within the city (Louisville) limits for shops and coal yards. Throughout the financial crisis this work has been vigorously pushed and all payments promptly made, to employees as well as to more pressing creditors.

Pennsylvania.

The engineers of this road, after long debate, have decided not to strike, but to continue at work at the reduction of 10 per cent. in wages. It is understood, we believe, that the company promises to restore the wages to the old standard as soon as business will warrant.

New Jersey Southern.

The employes of this company struck January 12, for the reason that they have received no pay for the last three months. The switches were spiked and some of the locomotives were disconnected, so that they could not be run, and all travel on the road was temporarily suspended.

It is stated that the trustees for the bondholders, who have possession, have made arrangements to pay current expenses, but not arrears due up to January 1. It is also stated that arrangements are being made to pay up the men.

(Continued on page 23.)

RAILROAD GAZETTE

Published Every Saturday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

CONTENTS.

Editorial Announcements.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

TRAIN ACCIDENTS IN 1873.

The record of "Train Accidents in December" which we give to-day enables us to make some summaries of facts for the year 1873, which heretofore have been given only for the separate months. Such a statement will indicate what accidents are most likely to happen at different seasons, and also, which is of more importance, to ascertain approximately what are the prevailing causes of accidents. It will be only an approximation, of course, for aside from the imperfection of our record, which is not so serious an objection on this score—for we are as likely to hear of one kind of accident as another, except the more insignificant ones—aside from this imperfection in the number of cases reported, there is doubtless a greater imperfection in the *causes* reported. These are, indeed, in a great part of the cases not ascertained certainly, and in a still larger number reported inaccurately. Still there is doubtless enough of truth in the figures given to demonstrate some facts and indicate others.

As given elsewhere, we have reported for 1873 the number of 1,283 accidents to railroad trains, by which 276 persons were killed and 1,172 wounded, the average number of accidents per day having been 3.51. A tabular statement of these accidents, classified according to their nature and causes, is given below. The first part of the table gives the number of those accidents of which there were ten or more in the year *for each month*.

COLLISIONS.

	Rear collisions.	Butting collisions.	Crossing collisions.	Unexplained.	Total.
January	15	13	1	4	33
February	13	9	—	13	35
March	12	8	6	2	28
April	8	6	1	8	23
May	9	8	—	4	21
June	18	6	4	7	35
July	16	9	4	10	39
August	31	12	—	10	53
September	21	8	7	4	40
October	19	8	3	3	33
November	11	10	2	2	25
December	14	5	3	5	27
Totals	187	102	31	72	392

DERAILMENTS.

	Unexplained derailm'ts.	Broken rail.	Misplaced switch.	Cattle on trck.	Accidental obstruct'n.	Washouts.
January	42	41	9	—	3	5
February	34	25	5	2	—	1
March	42	19	3	—	—	2
April	34	7	4	4	6	4
May	15	1	7	7	1	2
June	14	—	8	8	3	2
July	16	1	4	2	8	—
August	37	2	9	11	5	9
September	24	2	8	8	1	2
October	18	3	4	9	2	—
November	17	3	5	2	4	2
December	22	7	6	1	5	1
Totals	315	111	72	54	38	30

	Broken wheel.	Broken axle.	Breaking of bridge.	Spread'g of rails.	Malicious obstructions.	Defective switch.
January	8	4	2	—	—	4
February	5	—	1	—	1	1
March	3	2	—	1	—	—
April	—	—	3	1	—	2
May	1	2	—	1	2	—
June	1	3	2	2	2	—
July	—	1	2	1	1	1
August	3	2	3	3	2	—
September	2	2	2	1	—	1
October	1	4	1	1	1	—
November	2	—	1	2	1	1
December	—	1	2	—	1	—
Totals	26	21	19	13	11	10

A full list of the derailments for the year, including the above and those of which less than ten are reported, is as follows:

Unexplained	315
Broken rail	111
Misplaced switch	72
Cattle on track	54
Accidental obstruction	38
Road-bed washed out	30
Breaking of wheel	26
Breaking of axle	21
Breaking of bridge	19
Spreading of rails	13
Malicious obstruction	11
Defective switch	10
Failing of brake	9
Snow or ice on track	9
Loose rail	7
Breaking of track	7
Defects in track	7
Fall of load from car	6
Rail removed for repairs	6
Breaking of coupling	6
Runaway train	6
Defective frog	4
Open draw	4
Running fast into sidings	3
Man on track	2
Loose wheel	2
Flood over track	2
Breaking of joint	2
Rail maliciously removed	2
Breaking of car	1
Breaking of parallel rod	1
Breaking of buffer	1
Breaking of connection between timber trucks	1
Bad coupling	1
Loose chair	1
Unlocked switch	1
Misplaced rail	1
Wind	1
Explosion of powder placed on track	1
Mistaking signal	1
	815

Other accidents which did not cause any derailment, but some damage to rolling stock, were:

Explosions of boilers and cylinder-heads	19
Breaking of connecting-rod	11
Accidental obstruction	10
Breaking of wheel	8
Breaking of axle	7
Malicious obstruction	3
Cars burned in train	2
Breaking of truck	2
Stay-bolt blown out	2
Tree falling on train	2
	67
Nature and cause unknown	9
	76

A general summary gives us, then:

Collisions	392
Derailments	815
Other	67
Unknown	9
Total	1,283

The 315 unexplained derailments, and the 9 accidents whose nature or cause is unknown, subtracted from the whole number leaves 959 accidents which are in some manner explained; and of the derailments there are just 500 for which some cause is assigned. Of this latter number 22 per cent. are charged to broken rails, 14 per cent. to misplaced switches, 11 per cent. to cattle on the track, 7½ per cent. to other accidental obstructions on the track, and 6 per cent. to the washing out of road-bed. Thus these five causes are responsible for 60 per cent. of all the derailments for which any cause is assigned. Another more general classification charges 213 of the 500 to defects and failures of permanent way, and 75 to defects and failures of rolling stock, to which latter must be added 49 of the accidents which caused no derailment.

An examination of the tables of the accidents by months will show some notable facts. There is apparently no reason why collisions should be more frequent at one season than another, except the varying amount of traffic. The figures show an average of 32 2-3 per month, and the variations are not notable. With derailments by broken rails it is different. Of the whole number more than one-third occurred in the month of January, and very nearly four-fifths in the first three months of the year, which were distinguished even beyond ordinary winter months for severe cold weather and great snow storms. The derailments by running over cattle are, on the contrary, few in winter and numerous in mild weather, as is natural to expect. We report but five cases in the first three and last two months of the year, and an average of seven each month for the other seven, which form the grazing season for the most of the country. There is by no means the same contrast in the breakages of wheels and axles between the numbers in summer and winter. Taking those which caused and those which did not cause derailments together, 27 out of 62 cases, or about 44 per cent., occurred in the first quarter of the year, when 80 per cent. of the broken rails occurred.

As we have said, our information of causes of accidents is too imperfect to make inductions from these reports trustworthy, unless it may be in the cases where there is an overwhelming preponderance of commonly occurring cases in favor of them. They are suggestive, however, and may serve to indicate a few of the weak points which are most to be guarded against.

The Illinois Commissioners' Report.

The report of the Board of Railroad and Warehouse Commissioners, of the State of Illinois, part of which we publish elsewhere, gives very little material for reflection. The Commission's lawyer has supplied a series of extracts from judicial decisions and other authorities bearing on the power of the State to do what the new railroad law proposes to do in the way of regulating the business of railroad companies, but the story of the work of the Commissioners is a short one, and they apparently have no opinions to present. Neither do they present any inductions from the facts contained in the statistics which they have collected, which are of the first importance to any real understanding of the railroad question. We have not yet received these statistics, and so cannot now make any inductions for ourselves.

The work of the Commission, so far as appears from this report, has consisted in the preparation of tariffs of "reasonable maximum rates," which by the terms of the law became on the 15th of this month *prima facie* evidence that any higher rates are extortionate; in visiting various stations in the State to hear complaints, and in instituting suits for extortion against two railroad companies.

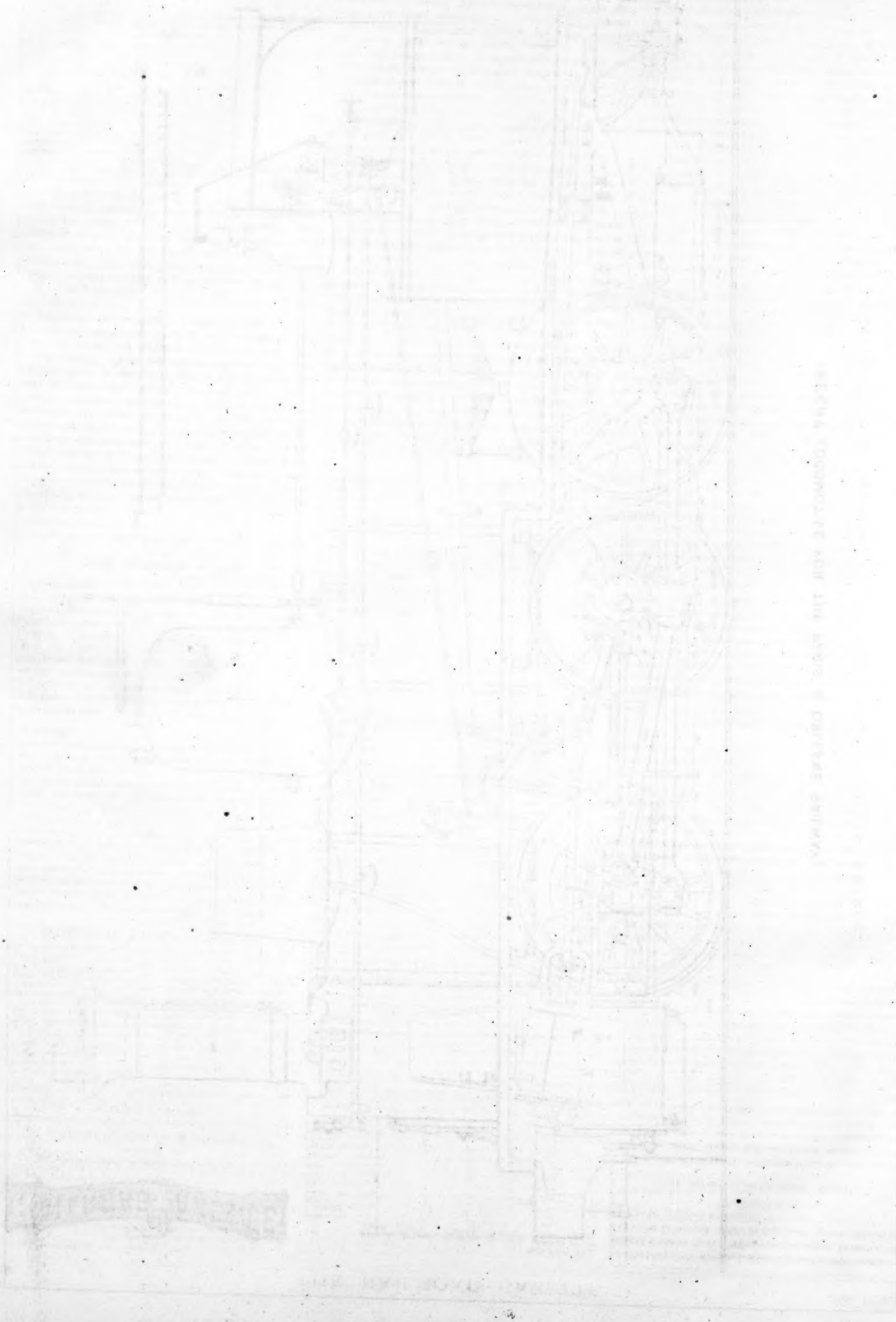
The work of preparing tariffs, it is true, if done at all well, would be sufficient to occupy the most skillful Board not one year but many; and it is only fair to assume that this Board is not now perfectly skillful, seeing that its members have only had about nine months' experience in the duties of their office, and have never had any experience in the somewhat complicated business of transportation, and that the most important part of the law under which they act was passed after their accession to office, did not go into full effect until this week, and has never been tried, nor anything like it, anywhere in the world. The Commissioners say that they have spared no efforts to make these schedules *just*, but they do not even hint at the principles on which they were formed, if there were any, or where they looked for information further than the comparison of printed tariffs and "the testimony of well-informed shippers." They do say, however, that they did not think it worth their while to seek information "from the only experts known to them"—that is, the general freight agents—alleging that their opinions were sufficiently expressed by their tariffs. This is very much as if, being called upon to ascertain what would be reasonable charges for a merchant to make to his customers, we should ask the opinions of the customers only, and accept from the merchant nothing but his price-marks without any explanation why he had made such prices. This course would probably suit the customers better than the merchant. If, however, the prices are to be fixed solely for the benefit of the customer and without any regard to the rights and interests of the dealers, then this, doubtless, is the best way.

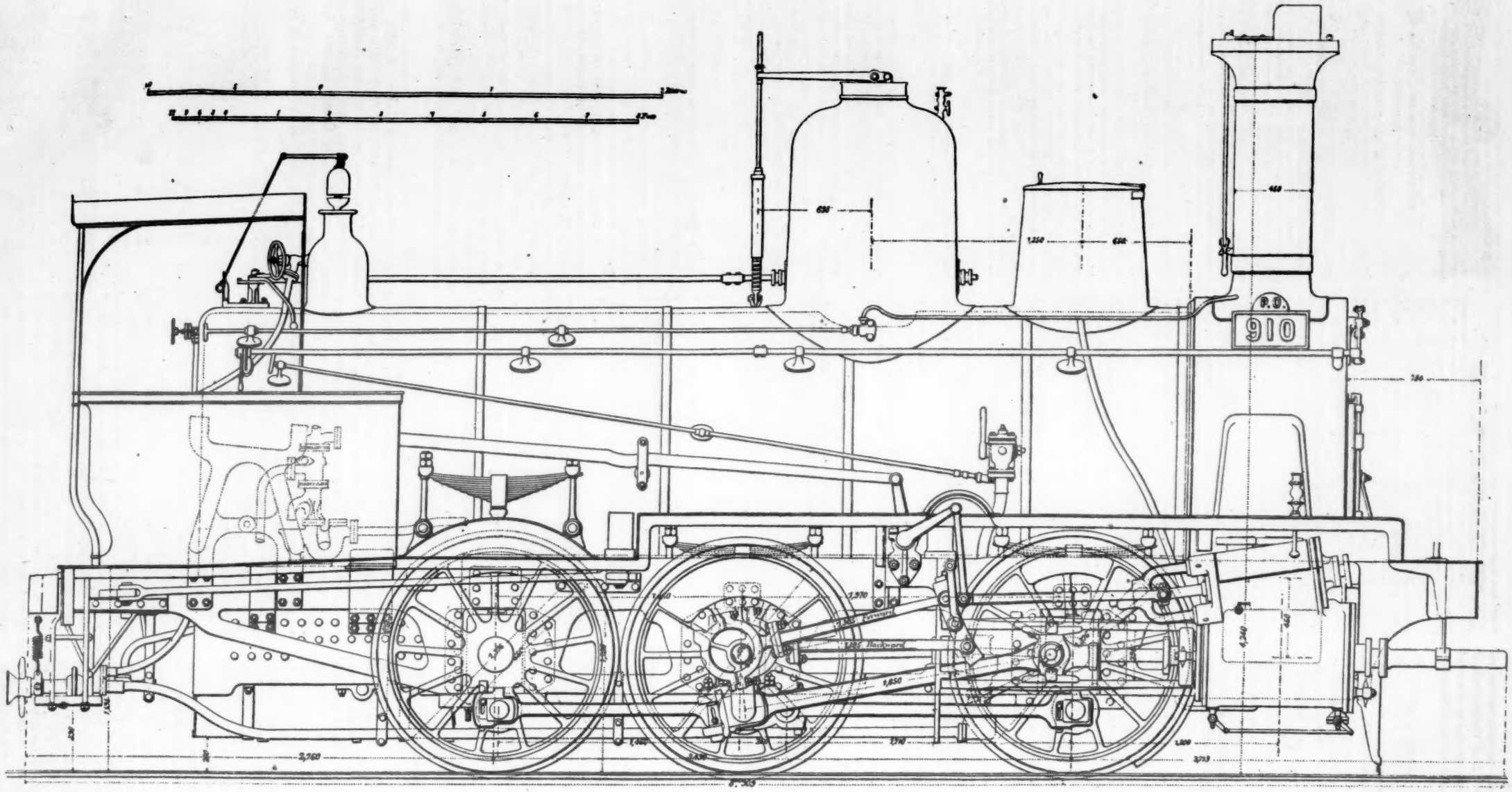
If the statistics which the Commission has collected are at all complete, they will show pretty exactly to what extent the Illinois railroads are robbing their patrons. A simple statement of capital expended, earnings, interest and dividends will go far towards solving this question.

The Catechism of the Locomotive.

This publication has met with so much favor that our supply of the RAILROAD GAZETTE of January 3, containing the first part of the Catechism, is entirely exhausted, and at the present rate of demand, all of the next number will soon be absorbed by new subscribers. We will, however, soon republish both these parts of the Catechism, so that those who send in their subscriptions now will have the whole of this publication. It may be added, that instead of being a translation from a German book, as the first announcement indicated, the Catechism is entirely rewritten, with new illustrations taken from the most improved and recent practice in locomotive construction, and that it is substantially a new book.

As we have received a large number of new subscribers from persons practically engaged in operating and constructing locomotives, we wish to say to them that the portion of the Catechism contained in the RAILROAD GAZETTE of last week and in the present number and also the part which will be published next week, although apparently of a somewhat vague, theoretical character, is of great practical importance, as will be shown hereafter. Those who desire to become acquainted with the principles involved in the operation and construction of the locomotive are therefore recommended to study that portion of the Catechism relating to the "Forces of Air and Steam" and on "Heat, Energy and Work" with great care, and familiarize themselves with these subjects, before the succeeding parts appear. Those inclined to seek more information in this direction than there is room to give in the space at our disposal are recommended to read Balfour Stewart's "Elementary Treatise on Heat," or Rankine's





FREIGHT LOCOMOTIVE FOR THE PARIS & ORLEANS RAILWAY.

CONSTRUCTED BY MESSRS. CLAPAREDE & CO., ST. DENIS, FRANCE.

"Manual of the Steam Engine." To understand the latter, however, requires a knowledge of both Algebra and Calculus. The former book is, as its name indicates, of a much more elementary character, and contains very little mathematical demonstration or illustration.

We will be very glad to receive suggestions and answer questions—if we can—from our practical readers as the publication of the Catechism progresses, and any parts which have not been made clear will be further explained if necessary.

Railroad Construction in 1873.

So far we have the following corrections to make in the record published last week:

The *Walla Walla & Columbia River* road is on the north instead of the south side of the Columbia, and is in Washington and not in Oregon.

In the description of the *Chicago Cut-off* of the Chicago & Northwestern the direction from Irving Park is misprinted *north*, when it should be *south*.

The *Indiana & Illinois Central* from the Douglas County, Ill., line is *east* to Montezuma, Ind., not west as printed.

The 24 miles of the *Indianapolis, Bloomington & Western* from Monticello to Decatur, Ill., and the 10 miles of the narrow-gauge *East Broad Top*, from Mount Union to Orbisonia, Pa., described in the "Record of New Railroad Construction" this week, were omitted from the report for the year. They bring up the total to 3,811 miles.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information (for the first time) of the laying of track on new railroads, as follows:

Elizabethtown & Paducah.—The *Louisville Extension* has had 15 miles of track laid on it since our last report. *East Broad Top.* Completed from the Pennsylvania Railroad at Mount Union southward 10 miles to Orbisonia. It is of 3 feet gauge. *Indianapolis, Bloomington & Western.*—The *Monticello Branch* has been extended from Monticello, Ill., southwestward 24 miles to a junction with the Illinois Central near Decatur.

This is a total of 49 miles of new railroad.

Freight Locomotive for the Paris & Orleans Railroad.

The full-page engraving of this engine which we give this week and the following description of it are copied from *Engineering.* The engraving represents a type of engine extensively used for freight traffic in Europe, but which has been entirely abandoned in this country. We do not feel nearly so certain that our practice is the best, and theirs all wrong, as many master mechanics and locomotive superintendents here do:

Although sent to Vienna by Messrs. Claparede & Co., the engine was not designed by them, but was one of a number they had in course of construction for the Paris & Orleans Railway from the plans of M. Forquenot, the Engineer-in-Chief of the company. As will be seen from our engravings, it is a six-coupled engine, with outside cylinders and valve-gear, and inside frames, while all the axles are under the barrel of the boiler. The principal dimensions of the engine are as follows:

	ft.	in.
Cylinders:		
Diameter	1	6.9
Stroke	2	1.6
Distance apart between centers	6	10.3
Wheels and frames:		
Diameter of wheels	4	6.2
Distance between centers of leading and driving wheels	6	5.6
Distance between centres of driving and trailing wheels	4	9.5
Total wheel base	11	3.1
Width between frames	4	0.4
Thickness of frames	0	1.1
Total length of engine over buffers	29	0.3
Boiler:		
Diameter of barrel inside	4	6.3
Thickness of plates	0	0.51
Height of center line above rails	6	4.8
Length of inside fire-box at top	4	4.75
Length of inside fire-box at bottom	4	5.9
Width of inside fire-box at widest part	3	6.9
Width of inside fire-box at bottom	3	6.3
Height of inside fire-box	5	5
Number of tubes	214	
Diameter of tubes outside	0	1 9
Diameter of tubes inside	0	1.75
Length of tubes between tube plates	14	4.8
	square feet.	
Heating surface: Firebox	93.6	
Tubes, external	1541.4	
Tubes, internal	1413.3	
Total with external tube surface	1635	
Total with internal tube surface	1506.9	
Fire-grate area	15.9 square feet	
Pressure of steam	114 lbs. per square inch.	
	tons.	
Weight of engine empty	33 07	
Weight of engine in working order (nearly equally distributed)	37.9	

It will be seen from the above dimensions that the engine is of a powerful class, the tractive force it is capable of exerting being

$$\frac{18.9^{s} \times 25.6}{54.2} \quad \frac{357.2 \times 25.6}{54.2} = 168.7 \text{ lb.}$$

for each pound of effective pressure per square inch on the pistons. With a mean effective pressure of 90 lbs. per square inch, the engine would thus exert a pull of 15,183 lbs., or rather less than 18 per cent. of the weight available for adhesion. The manner in which the pull of the engine is transmitted to the framing is a special point which we must notice here. Instead of being attached direct to the framing at the trailing end, the draw-bar is coupled to the centre of a beam which extends across the engine beneath the footplate, and which is connected by a pair of side rods or links to a similar transverse beam arranged under the boiler between the driving and trailing wheels, this latter beam oscillating on a centre held by transverse stays. The pull is thus transmitted to a point well forward, and the engine is left more free to adjust itself to the road than is the case when the draw-bar is coupled to the frame direct at the trailing end.

The boiler has a flush-topped firebox casing and very large dome; but it possesses no special peculiarities requiring notice here, except that we may mention that the tubes are steadied by passing them through a guide-plate fixed near the centre of the length of the barrel, as shown in the transverse section. This is a plan which used at one time to be resorted to in this country, but which has long been abandoned here. * * * The valve-chests are situated above the cylinders, the valve-faces being inclined both longitudinally and transversely, as shown. In addition to the ordinary cylinder cocks, the cylinders are fitted with spring-loaded relief valves fixed on each cover, as shown in the side elevation.

The piston-rods are carried through the front cylinder covers, and the working gear generally is of heavy proportions. The valve-gear is of the stationary link type, and the radius rod is coupled to a "dummy" valve spindle carrying an arm, from which the true valve spindle is driven. The outer end of the "dummy" spindle is guided by an unnecessarily massive guide arranged as shown in the side elevation, the legs of this guide entering sockets cast on the cylinder, and being secured in place by cotters. The whole forms a costly arrangement, and one difficult to adjust. The coupling rods are connected so as to be flexible both horizontally and vertically, the pin at the hind end of each of the front lengths being made with a spherical center, the hind length of coupling rod being fitted with a movable wedge piece and cotter, to enable this spherical center to be inserted. * * * The trailing springs, however, are arranged above and outside the line of the frames, they resting upon the ends of a transverse beam, from which the pressure is transmitted by pins to the trailing-axle boxes.

The engine we have been describing belongs to a class which we believe do their work satisfactorily, but we must certainly suppose that æsthetic principles were entirely disregarded in its design. The cab provided is decidedly ugly, while the footplate, placed as it is at various levels, and terminating as it does with a slope at the trailing end for the length of the handrail plate, imparts a very crude character to the general appearance. The latter is also not improved by the effect of the brass lagging plates, which, as in many French locomotives, are used for covering the boiler, dome and sand-box. The engine shown at Vienna had not been specially prepared for exhibition, but was merely sent as a sample of the ordinary work of the makers. The working parts, we may add, were left just as they came from the machine tools.

Train Accidents in December.

On the 1st, a south-bound mail train on the Raleigh & Gaston Railroad ran off the track near Gaston, N. C.

On the 1st, in the yard of the Toledo, Peoria & Warsaw Railway in Peoria, Ill., there was a collision between two freight trains which caused some damage to the trains and the discharge of some train-men.

On the night of the 1st, near Moscow, Tenn., on the Memphis & Charleston Railroad, a freight train was thrown from the track by a broken rail, several cars were destroyed, and one brakeman was killed.

On the 2d, at West End, on the New Jersey Midland, a coal train backed into a coach which was standing on a siding, and badly damaged it.

On the 2d, at Altoona, Pa., on the Pennsylvania Railroad, as a west-bound express train was coming into the depot the engine jumped the track and swung around, and the express car was thrown upon one of the iron posts of the depot with such force as to break it off and cause part of the depot to fall on two express cars and a baggage car, breaking them badly, and killing a newsboy. The loss is reported at $50,000.

On the 2d, near Cranford, N. J., on the Central Railroad of New Jersey, a coal train was thrown from the track and several of the cars destroyed.

On the 2d, at Morrisville, N. J., on the New York Division of the Pennsylvania Railroad, the Adams express train jumped the track, doing slight damage to cars and tender.

On the night of the 2d, about a mile from Portage, Wis., on the Northern Division of the Milwaukee and St. Paul Railway, there was a collision between a west-bound mixed train and an east-bound freight, by which both locomotives were badly wrecked.

On the morning of the 3d, near Wantage, N. J., on the New Jersey Midland Railroad, a passenger train ran into a large rock which had slid down upon the track, disabling the locomotive.

On the night of the 3d, a north-bound freight train on the Baltimore & Potomac Railroad was thrown from the track near Patapsco Station, Md., by the breaking of an axle under a freight car. Several cars were wrecked and the road badly damaged, delaying all trains for several hours.

On the night of the 3d, at Hobbs, Ind., during a great storm of wind and rain, the engine of a passenger train on the Ohio & Mississippi Railroad was thrown from the track by a tree blown across the track, and the engineman and fireman were slightly injured.

On the night of the 3d, near Rushville, Ind., on the Cambridge City Branch of the Jeffersonville, Madison & Indianapolis Railroad, the engine and three cars of a freight train were thrown from the track by a tree blown across the track in a great storm, and the engineman and fireman were killed.

On the 4th, shortly after midnight, at Tilton, Ill., on the Toledo, Wabash & Western Railway, a passenger train ran into two cars that had been blown down a siding into the main track. The cars were thrown one on each side of the track so as to quite clear the track, but the engine lost its smoke-stack and was otherwise damaged, but was yet able to back its train into Danville.

On the morning of the 4th, on the edge of the city of Buffalo, a passenger train on the New York Central & Hudson River Road, which had started from Niagara Falls, ran off the track where the road-bed had been carried away by a great flood, which washed large rocks against the cars and made it necessary to remove the passengers in a tug-boat.

On the morning of the 4th, near Hogan's Mills, W. Va., on the Baltimore & Ohio Railroad, a freight train ran over a cow as it was approaching a bridge, causing the engine to jump the track, knock down the bridge, and fall with seven cars into the creek, injuring the engineman fatally and the fireman severely.

On the morning of the 4th, near Hawleyville Tunnel, on the Housatonic Railroad, a north-bound passenger train ran into three or four large rocks, which had been loosened by floods and had rolled upon the track. Slight damage was done.

On the morning of the 4th, near Plymouth, Ind., on the Pittsburgh, Fort Wayne & Chicago Railway, the locomotive and four baggage cars of a west-bound passenger train were thrown from the track and wrecked by a fallen tree. The train was running more than 30 miles an hour, and the blow broke the tree in two; the tender jumped over the engine, and the baggage car next behind fell on the cab.

On the 4th, at Waseca, Minn., on the Winona & St. Peter Railroad, four empty box cars which had been left standing at an elevator on a siding were blown down to the switch, where they ran off, leaving the rear of one projecting over the main track. A west-bound passenger train in the night struck this car, damaging the engine slightly.

On the afternoon of the 4th, as a Davenport & St. Paul freight train of eleven cars was crossing the Dubuque Southwestern's bridge over the Maquoketa River, three miles above Monticello, Iowa, a span 150 feet long fell just after the engine and tender had crossed, dropping six cars loaded with grain, live hogs and lumber into the river. The bridge was a Howe truss, built two years before, and the failure is attributed to the sudden contraction by severe cold weather of the rods which before had been screwed up tight.

On the morning of the 5th, at Platte City, Mo., on the Southwestern Division of the Chicago, Rock Island & Pacific Railroad, a working train of nine flat cars and a caboose, the latter containing 21 laborers, was started down towards a switch to enter a siding while the engine and tender went up the main track. The caboose was in front of the other cars, and when it struck the frog it jumped the track and was thrown on its side and badly wrecked, killing one man and injuring two others.

On the morning of the 5th, at Neapolis Switch, O., on the Toledo, Wabash & Western Railway, a fast express train ran into a loaded car (which had been blown from the siding to the main track), throwing the engine across the track badly wrecked, and piling three cars in the ditch. The engineman and fireman were severely injured, the conductor and express messenger slightly.

On the morning of the 5th, between Winthrop & Independence, Iowa, on the Iowa Division of the Illinois Central Railroad, six cars of a freight train were thrown from the track.

On the afternoon of the 5th, near Somerset Junction, Mass., on the Old Colony Railroad, a truck broke under a coach of a north-bound passenger train, throwing the car from the track and blockading the road a few hours.

On the morning of the 6th, near Creston, Iowa, on the Burlington & Missouri River Railroad, one end of a stock car burst out, and a steer fell out upon the track and wrecked seven car loads of cattle.

On the 6th, at West Albany, N. Y., on the New York Central & Hudson River, a misplaced switch turned an express train on the wrong track, where it ran into a freight train, damaging the express engine and overturning that of the freight train, demolishing six freight cars, and slightly injuring the engineman and fireman of the express.

On the 6th, a west-bound train on the Iowa Division of the Illinois Central Railroad ran into a hand car loaded with rails, one of which penetrated the flue sheet of the locomotive, and three cars were thrown from the track. The fireman was injured in jumping.

On the night of the 8th, near Hobart, Ind., on the Pittsburgh, Fort Wayne & Chicago Railroad, there was a butting collision between freight trains by which both locomotives and a number of cars were destroyed.

On the night of the 8th, between Eatontown and Shark River, on the New Jersey Southern Railway, a passenger train ran into a rail which had been placed between the rails pointing upward, throwing the locomotive from the track. A man who had been an employe of the company was arrested and confessed the crime.

On the morning of the 9th, at Paterson, N. J., on the Erie Railway, a switchman forgot to close a switch after switching a train, and soon a coal train of ten cars ran upon the switch and off the track, blocking both tracks and delaying trains somewhat.

On the afternoon of the 9th, near Narrowsburg, on the Erie Railway, a passenger train ran into the rear of an extra, breaking the passenger engine, mail car and baggage car.

On the afternoon of the 11th, about 15 miles north of Goldsboro, N. C., on the Wilmington & Weldon Railroad, one coach of an express train was thrown from the track by a broken rail, and dragged about a quarter of a mile before the train was stopped.

On the evening of the 11th, at Ferris, the crossing of the Toledo, Peoria & Warsaw and the Quincy & Burlington Branch of the Chicago, Burlington & Quincy Railroad, an east-bound passenger train on the Toledo, Peoria & Warsaw ran into a south-bound freight on the Burlington road as the latter was crossing, throwing one freight car into the ditch, and the other upon the platform of Ferris depot. There was a dense fog at the time.

On the morning of the 12th, at Oakland, Md., on the Baltimore & Ohio Railroad, an engine ran into the rear of a locomotive and caboose which were waiting for time on a siding, crushing the caboose and injuring the fore part of the striking engine, while the fireman of the engine struck had his leg broken in jumping.

On the morning of the 12th, at Montclair, N. J., on the Morris & Essex Division of the Delaware, Lackawanna & Western Railway, a coal train ran off the track and several cars were wrecked, blocking the road two hours.

About daylight on the 12th, six miles north of Quincy, on the Quincy & Burlington Branch of the Chicago, Burlington & Quincy Railroad, a bridge whose foundations had been injured by freshets gave way under a freight train, letting five empty cars and one loaded car fall into the channel.

On the morning of the 12th an engine on the Morris & Essex Division of the Delaware, Lackawanna & Western Railroad jumped the track near the east end of Bergen Tunnel. Trains were delayed some time.

On the morning of the 12th, at Stony Creek, Ont., on the Great Western Railway of Canada, there was a collision between two freight trains by which ten cars were badly wrecked.

On the morning of the 12th, near Pittsburgh, Pa., on the Cleveland & Pittsburgh Railroad, a north-bound passenger train ran off the track.

On the 12th, the locomotive of an accommodation train on the New York and Oswego Midland Railroad jumped the track while on a part of the Lyon Brook bridge which is 166 feet high. The wheel caught and stopped the train.

On the afternoon of the 12th, at the yard in Camden on the Amboy Division of the Pennsylvania, there was a collision between in and out-going trains, doing considerable damage to cars.

On the evening of the 13th three cars of a coal train jumped the track at a crossing in Paterson, N. J., blocking both tracks nearly an hour.

On the night of the 13th, near Ipswich, Mass., on the Eastern Railroad, a north-bound freight train ran off the track and several cars were smashed.

On the afternoon of the 14th, as an east-bound passenger train was running out of the Columbus yard of the Central Ohio Division of the Baltimore & Ohio Railroad, the boiler of the locomotive exploded with terrible force, killing the engineman and slightly injuring the fireman on that locomotive, badly injuring the engineman and fireman of a switching engine which was on a siding near by, blowing the locomotive into a pile of scrap, and blowing to pieces numbers of freight cars in trains alongside. It is reported that the steam-gauge indicated but 90 pounds when the boiler exploded, and that the latter was comparatively new.

On the morning of the 16th, near Calhoun, Miss., on the New Orleans, Jackson & Great Northern Railroad, a north-bound passenger train ran into the rear of a north-bound freight, causing the caboose of the latter to telescope over the flat car in front, severely injuring a trainman. The freight put no flag out until the passenger was within less than 200 yards, and that the consequences were not more serious is believed to have been due to the air brakes, as the passenger was running about 30 miles an hour.

On the morning of the 16th, on a temporary track extending into the Kaw River near Kansas City, for convenience in moving material for a new bridge for the Kansas Pacific Railway, two flat cars were backed down into the river, either from failure to brake or neglect to stop the engine in time.

On the night of the 16th, at Rutherfurd Park, N. J., on the Erie Railway, three cars of a freight train jumped the track while leaving a siding to cross the track, wrecking them completely and blocking the road an hour.

On the morning of the 17th, a suburban passenger train on the New Jersey Railroad, ran into the caboose of a coal train on the Bay Bridge, throwing onecar from the track.

On the morning of the 17th, a switching engine on the Hudson River Railroad, ran into a suburban train at Fifty-first street in New York, breaking a locomotive and several cars. There was a dense fog at the time.

On the 17th, as a passenger train on the Central Railroad of Long Island was approaching Garden City three of the coaches were thrown from the track.

On the 18th, at Summit Valley, on the Central Pacific Railroad, a freight train ran off the track, blocking the road some time.

On the night of the 18th, near Stockwell, Ind., on the Indianapolis, Cincinnati & Lafayette Railroad, the pay train was thrown from the track by a misplaced switch. turned, it is supposed, in hopes of an opportunity to rob the train.

On the night of the 18th, a transfer freight train running between the yards of the Milwaukee & St. Paul in Milwaukee ran into a freight standing on a siding, wrecking two cabooses and a car loaded with grain.

On the morning of the 19th, a locomotive was backed off the track of the New Jersey Southern Railroad at Pemberton Junction, blocking the road some hours.

On the 19th, a little west of Shullsburg, Iowa, on the Burlington, Cedar Rapids & Minnesota Railroad, three or four cars in the middle of a north-bound freigh train were thrown into the ditch by a broken rail, injuring a brakeman. The rail had been discovered by a preceding train, and a dispatch sent back to warn the next train, but too late.

On the 20th, about 1 o'clock in the morning, near Kennebunk, Me., on the Eastern Railroad, there was a butting collision between a north-bound and a south-bound freight train, by which one locomotive was badly injured, seven cars broken up, and three trainmen were killed and two wounded. The south-bound train broke in two before reaching Kennebunk, while going down a long, steep grade, and the locomotive was urged on to the station lest the rear section should overtake it. But as it did not come up, the operator at Kennebunk was asked to hold trains north-bound and the train backed to take in the section which had broken off, and it was after doing this and starting for Kennebunk again that the collision occurred, the north-bound train having passed that station. At the coroner's inquest men of the south-bound train testified that a red light was put out at Kennebunk to hold the north-bound train, while men of the north-bound train testified that there was no signal out there, and moreover that the operator there said he had no orders for them and made no objection to their going on, which they did, though without orders they should have waited at Kennebunk to pass the south-bound train. The verdict charged that the accident was owing to "the incompetency and negligence of the train dispatcher; the gross error in judgment of the Kennebunk operator; and the culpable negligence of the conductor and engineman of the north-bound train."

Very early in the morning on the 20th, an extra south-bound freight train ran into the rear part of a preceding south-bound freight which had broken in two below Milton, Vt., on the Vermont Central Railroad, injuring several cars and the striking locomotive.

On the morning of the 20th, seven cars of a way freight train on the Illinois Central Railroad ran off the track at La Salle, Ill., and were badly wrecked, blocking the road several hours.

On the night of the 21st, near Harvard, Ill., on the Wisconsin Division of the Chicago & Northwestern Railway, six cars of a south-bound freight train were thrown from the track by a broken rail, and the conductor and a brakeman were injured.

On the morning of the 22d, at Ricker's Mills, Vt., on the Vermont Central Railroad, the locomotive of a south-bound train was thrown from the track where it was flooded with water, damaging it slightly.

On the morning of the 22d, at Hudson, N. Y., at the crossing of the New York Central & Hudson River and the Hudson Branch of the Boston & Albany, a train on the former road ran into one on the latter, breaking up three cars.

On the 22d, near Wentzville, Mo., on the St. Louis, Kansas City & Northern Railway, there was a butting collision between a passenger and a construction train, wrecking both engines and doing damage to the amount of $25,000, as reported. The engineman of the passenger train was badly hurt in jumping.

On the evening of the 22d, near Lansdale, Pa., on the North Pennsylvania Railroad, the boiler of a locomotive exploded. The engine was three years old and had a steel boiler. It was one of three with steel boilers built at the time, and another of them exploded in Philadelphia about a year ago.

On the night of the 22d, in Indianapolis, an Indianapolis, Bloomington & Western freight train ran into the rear of a Bee Line freight which was backing out of a siding, throwing several cars into the ditch.

Very early in the morning on the 24th, a west-bound freight train on the Lake Shore & Michigan Southern was thrown from the track by a misplaced switch at East Buffalo, N. Y.

Early in the morning on the 24th, at Camden, N. J., a Pennsylvania Railroad engine having just been backed into the car-house, the boiler exploded, tearing off the roof of the building and damaging other locomotives near by. A watchman standing by the locomotive was injured fatally, the engineman and fireman severely.

On the morning of the 24th, near East Hampton, Connecticut, on the New Haven, Middletown & Willimantic Railroad, as a mixed train was approaching an embankment about 60 feet high, a brake fell from a box car upon the track and broke off a passenger car and two freights from the rear of the train. The passenger remained on the track, one of the freights fell upon its end and the other upon its side, and a brakeman was killed.

On the morning of the 24th, one section of a west-bound freight train ran into the preceding section on the Saltsburg bridge of the West Pennsylvania Division of the Pennsylvania Railroad, damaging engine and cars.

On the 24th, four miles north of Millican, Texas, on the Houston & Texas Central Railroad, a south-bound freight train ran off the track, doing considerable damage to cars and track and blocking the road three hours.

On the 27th, six flat cars of an extra wood train on the Lake Superior & Mississippi Railroad were thrown from the track and wrecked north of White Bear Lake, Minn., by a broken rail. The engine did not leave the track and the cars were not badly wrecked.

On the afternoon of the 27th, near Shortsville, N. Y., on the Auburn Division of the New York Central & Hudson River Railroad, an east-bound mixed train ran into the rear of a freight train, which had halted at the station, and plowed through 18 coal cars, dangerously injuring the engineman of the accommodation.

On the night of the 27th, during the engineers' strike, on the Little Miami Railroad, a south-bound passenger train which Mr. J. H. Setchel, the Master Mechanic of the road, was running, when in Columbia in the suburbs of Cincinnati was thrown from the track by a switch which had been maliciously misplaced, and the locomotive struck and wrecked some cars standing on the siding and pushed them into a small house at the end of it. Mr. Setchel, the conductor, and the express messenger were injured.

On the 28th, early in the morning, a freight train on the Mobile & Montgomery Railroad got into the ditch below Greenville, Ala., blocking the road about 15 hours.

Early in the morning of the 28th, at Walbaum, Ind., on the Chicago line of the Pittsburgh, Cincinnati & St. Louis Railway, during the engineers' strike, a north-bound passenger train was thrown from the track by a switch maliciously misplaced, the engine, baggage car and one coach going off.

On the evening of the 28th, at Cadiz, O., on the Pittsburgh, Cincinnati & St. Louis Railway, during the engineers' strike, a west-bound express train ran off at a switch which had been maliciously misplaced.

On the morning of the 30th, at the crossing of the Joliet Cut-off and the Chicago line of the Pittsburg, Cincinnati & St. Louis Railway, 29 miles from Chicago, a freight train on the Cut-off ran into a south-bound mail on the other road, which was taking in water, and threw its locomotive into the ditch badly wrecked, dangerously injuring the engineman and fireman.

On the 30th, two coaches of a passenger train from Minneapolis to St. Paul on the St. Paul & Pacific Railroad, jumped the track near St. Paul.

On the 30th, four miles east of Whalen, Minn., on the Southern Minnesota Railroad, a freight car of a west bound mixed train was thrown from the track by a broken rail just before reaching a bridge, and when it reached the bridge the truck dropped through and threw the express car, mail car, and three freight cars into the creek, wrecking them badly, and injuring the conductor, express messenger and one other person, who were in the express car.

On the 31st, a mile below Welborn, Texas, on the Houston & Texas Central Railroad, eight cars of a south bound extra freight train ran off the track and a brakeman was killed.

On the evening of the 31st, half a mile west of Brownsville, Ind., on the Cincinnati, Hamilton & Indianapolis Railroad, the rear coach of a west bound passenger train was thrown from the track and over a trestle ten feet high by a broken rail. Two passengers were killed and nine injured.

Early in the month there was a collision between two trains on the Missouri, Kansas & Texas Railway in the Indian Territory, and one man was killed.

This is a total of 80 train accidents, by which 16 persons were killed and 43 injured. Twelve of them caused deaths or deaths and injury, and thirteen others injury but not death, leaving 55 by which the damage was to property only.

These accidents may be classified as to their nature or causes as follows:

DERAILMENTS.	
Unexplained	22
By Broken rail	7
Accidental obstructions	5
Misplaced switch	6
Failure of bridge	2
Breaking of axle	1
Breaking of truck	1
Falling of brake	1
Washing out of road-bed	1
Cattle on track	1
Malicious obstruction	1
Flood	1—49
COLLISIONS.	
Unexplained	5
Rear collisions	14
Butting collisions	5
Crossing collisions	3—27
Boiler explosions	3
Locomotive disabled by fallen rock	1
Total	80

Of the "accidental obstructions," three were trees blown across tracks, one a rock loosened by a flood, and one an animal fallen from a car. Three of the rear collisions were with cars blown from sidings to the main track, and one was caused by a misplaced switch. In four of the derailments by misplaced switches, the misplacement was malicious. A number of the accidents in the early part of the month were due indirectly to severe storms of wind and rain, and three in the latter part are charged to the malice of enginemen on a strike.

Ten of the accidents are traceable to defects or failures of permanent way, and six to defects or failures of rolling stock. An unusual number are unexplained.

For the twelve months of the year 1873 our record stands as follows:

	No. of Accidents.	Killed.	Injured.
January	178	40	199
February	139	25	126
March	112	18	92
April	101	23	88
May	79	10	113
June	90	12	104
July	90	18	80
August	150	63	155
September	106	29	75
October	88	11	47
November	76	11	50
December	80	16	43
Totals	1,283	276	1,172

In December of the previous year we reported 112 accidents, 42 killed and 133 injured. The month is one of the most favorable of the year, contrary to what is usual; but the openness of the winter has doubtless had a very favorable effect.

The average number of accidents per day for each month has been, according to our reports:

January	5.74	May	2.55	September	3.53
February	4.75	June	3.00	October	2.84
March	3.61	July	2.90	November	2.53
April	3.37	August	4.84	December	2.58

The average for the twelve months was 3.51 per day.

The Illinois Railroad Commissioners' Report.

Three-fourths of the text of the report of the Illinois Railroad and Warehouse Commissioners, submitted to the Governor December 1, and by him submitted to the Legislature with his message at the extra session which began on the 7th inst., consists in legal opinions on the validity of the existing railroad laws of Illinois, or of certain parts of them, in which the conclusions arrived at that the laws are valid, and that the action of the Commissioners under them in establishing "maximum reasonable rates" of fares and freight will stand the test of the courts. We do not believe that this part of the report would be of much interest or value to our readers. The part of the report which relates to the acts and plans of the Commission is as follows:

PREPARATION OF THE SCHEDULES AND CLASSIFICATION OF FREIGHT.

The work of preparing the schedules, directed by the eighth section of the act of May 2, 1873, for the railway corporations doing business in this State, together with a classification of freight, explanatory and forming a part of each of the schedules to be prepared by the Commissioners, was commenced early in the month of August last, with the intention of having them published, if possible, in ample time to afford members of the adjourned session of the General Assembly, before they convene in January next, and all others interested, an opportunity to examine the same.

The Commissioners, impressed with the magnitude and importance of the undertaking, entering as we were upon a track then unbeaten, and anxious to secure the greatest accuracy possible in our schedules, indulged the hope that, by thus submitting them, such suggestions and criticisms would be called forth as would lead to the making of any needed changes, and to the correction of any errors that might have existed in the tariffs and classification, at the time of publication.

Suggestions of value from the sources mentioned have been received, of which we shall avail ourselves in time to have them appear in the revised and corrected schedules and classification of freight, to be completed and published in a supplemental tariff sheet, before the meeting of the next General Assembly.

The chief value of a schedule, such as we are now considering, is the *justness of its rates*. To this point, therefore, our labors have been mainly directed. No efforts have been spared to obtain information deemed by us likely to aid in arriving at correct conclusions, bearing upon the subject of reasonable maximum rates for the organized railways of the State. A careful comparison of the published tariffs of the railway companies of this and many of the other States was made, with the view to determine in what particulars they agreed or differed, when compared with each other. We will not attempt here to exhibit, in detail, the differences that were found to exist, even among roads having very much the same characteristics. It may be mentioned, however, that differences wide apart, and difficult of explanation, were found by a comparison of their local tariffs. It is proper to state in this connection that with the tariffs of most of the principal roads of the country before us, prepared by the general freight agents of the various roads *themselves*—the only experts known to the Commissioners in a work of this kind—it seemed that no valuable purpose would be accomplished by inviting them (the general freight agents) to a conference, or to seek from them information bearing upon the subject of tariffs, otherwise than in the manner mentioned: by an inspection of their published schedules. In the few instances when they have been personally consulted, they have generally referred us to their schedules, as indicating their views in regard to the justness of a tariff of rates for their particular line of road, and, we believe, without an exception, have insisted upon the correctness of the principles embodied in their published rates.

Prominent among the subjects considered in preparing the schedules, we mention the following: Amount of capital invested in road and equipment: amount of business done; average proportion of operating expenses to the gross earnings, etc. That which in a greater degree, however, contributed to assist in this department of our labor, was the testimony of well informed shippers from different parts of the State, including dealers in grain, lumber, coal, bar iron, and steel, live stock, and merchandise of almost every description.

From the representatives of these various interests we have received much information that was valuable in fixing what we trust will prove to be an equitable and remunerative passenger and freight rate for all the railway companies now organized under the laws of this State.

Mention has already been made of our intention to make some changes in the schedules and classification of freight. Availing ourselves of that provision of the law which wisely gives to the Commissioners "from time to time and as often as circumstances may require," the power to change and revise the schedules made by them, we will, as soon as relieved of official duties more urgent in their nature, make some slight changes in the classification of freight, and also in the rates of lumber by the car load for the roads following, to wit: Toledo, Wabash & Western; Chicago & Alton; Chicago, Burlington & Quincy; Chicago & Northwestern; Chicago, Rock Island & Pacific; Illinois Central; Indianapolis & St. Louis; Ohio & Mississippi; St. Louis, Vandalia & Terre Haute; Columbus, Chicago & Indiana Central; Indianapolis, Bloomington & Western. These contemplated alterations in the tariffs and classifications, other than has been mentioned, have not yet been agreed upon. They are, however, under advisement by this Board, and will be determined on and published at an early day.

For the greater convenience of all, we have made five divisions of the roads of the State, and in the absence of any satisfactory reason for a different arrangement, we have given to the roads associated in their respected divisions a corresponding rate. The first division is enumerated above. The second includes Michigan Central; Lake Shore & Michigan Southern, and Pittsburgh, Fort Wayne & Chicago. The third division, Chicago, Danville & Vincennes; Toledo, Peoria & Warsaw; St. Louis, Alton & Terre Haute; Illinois & St. Louis Railway & Coal Company, and Western Union. The fourth division, Peoria, Pekin & Jacksonville; Peoria & Rock Island; Rockford, Rock Island & St. Louis, and St. Louis & Southeastern. The fifth division includes all organized railways in this State not mentioned in the foregoing divisions or groups. It will be observed from the following quotation from the eighth section of the act of May 2, 1873, that a *separate* schedule is required for each of the railways in the State: "The Railroad and Warehouse Commissioners are hereby directed to make for each of the railroad corporations doing business in this State, as soon as practicable, a schedule of reasonable maximum rates of charges for the transportation of passengers, and freight, and cars on each of said railroads," etc., etc. In compliance with this requirement of the law, a separate schedule has been made and published for *each* of the railway corporations doing business in this State. For the rates fixe for the several roads we beg leave to refer to the published schedules and classification of freights.

There is, perhaps, no feature connected with railway tariffs in which the people at large feel a deeper interest, apart from the justness of rates, than that of stability in rates. We do not mean, of course, that the rates should not be subject to change, nor subject to change in the manner prescribed by the law under which these schedules are prepared—to meet the wants from time to time of all the interests involved; but that the tariffs should have such a system of agreement or harmony in all their parts, and be so impartial in the purposes intended in their arrangement, as to leave the necessities for change as few as possible, and then no change should be made until due notice of the intended change is made public. By the sudden and unexpected alterations that are frequently made by the managers of railway corporations in their rates, great injustice is done to the patrons of their roads. Take, for instance, a single case: A makes a purchase on the 1st day of June of 1,000 head of cattle, which he has contracted to deliver in Chicago on the 7th day of July following; distance from point of shipment to Chicago, 200 miles; local rate for cattle at the time of purchase—open to all—$30 per car-load. Rates at the time of shipment, $40 per car-load. Say he ships 17 cattle to the car—59 cars in all; the loss to A on each car would be $10. Total loss on the 1,000 cattle, $590.

And this is on a single shipment, occasioned by an advance in rates that A had no means of anticipating or any knowledge of until his cattle were driven to the station for shipment.

The case given is a supposed one; but actual cases, resulting in loss and disappointment to the shipper, we might multiply almost indefinitely. To remedy this evil that has so long existed to the injury of shippers, and of which there is so much just cause of complaint, provision is made in the law of 1873 requiring the Commissioners, where changes are made in the schedules prepared by them, to cause publication to be made for three successive weeks, etc.

We have said elsewhere in this report that the chief value

of a schedule is the justness of its rates. We have also briefly alluded to another important feature—stability in rates. In closing our remarks upon the preparation of the schedules, we mention the greater requisite of three: To whomsoever it is made the duty to do this work, he must be capable and honest, turning neither to the right hand nor to the left; for without these indispensable qualifications combined—ability to do the work and honesty of purpose in its execution—his labors will be of no avail.

INQUIRIES AND COMPLAINTS.

By the seventh section of the act of May 2, 1873, it is made the duty of the Commissioners "to personally investigate and ascertain whether the provisions of this act are violated by any railroad corporation in this State, and to visit the various stations upon the line of each railroad for that purpose as often as practicable." In fulfillment of this requirement of the law, the Commissioners, during the months of September, October and the early part of November, visited forty-three points along the lines of the principal roads of the State, including competing and non-competing points, and at these stations held formal meetings, a full board being present at most of them, and at all a majority of the board was in attendance. At these meetings we took the testimony of over 500 shippers, pertaining mostly to the duties imposed by the seventh section of the act of May 2, 1873. The information thus acquired from the business men of these different localities proved to be of great advantage, furnishing as it did a vast amount of information we could not have obtained so well in any other way. The law also provides that "whenever the facts, in any manner ascertained by said Commissioners, shall, in their judgment, warrant such prosecution, it shall be the duty of said Commissioners to immediately cause suits to be commenced and prosecuted against any railroad corporations which may violate the provisions of this act. Such suits and prosecutions may be instituted in any county in the State through or into which the line of the railroad corporation sued for violating this act may extend. And such Railroad and Warehouse Commissioners are hereby authorized, when the facts of the case presented to them shall, in their judgment, warrant the commencement of such action, to employ counsel to assist the Attorney General in conducting such suit on behalf of the State."

PROSECUTIONS.

In order to enforce this provision of the law, the Commissioners, on the 30th day of October, 1873, authorized the Attorney General, the Hon. James K. Edsall, to bring suit against the Chicago & Northwestern Railway Company, at Freeport, Stephenson County, and the Illinois Central Railroad Company, at Urbana, Champaign County. The suits are brought for extortion in the name of the People, etc., vs. the roads mentioned, in an action of debt, and now pending and undetermined in the circuit courts in the counties above named. We have, as provided by law, employed counsel to assist the Attorney General in conducting the same on behalf of the State. We offer in explanation for any seeming neglect on our part in not bringing other suits where the law has been violated, the fact that the schedules made by us do not become *prima facie* evidence of reasonable maximum rates of charges until the 15th of January next. It was therefore thought best, and we were so advised by our legal counselors, not to bring any greater number of suits until the schedules become *prima facie* evidence.

GENERAL REMARKS.

The creation of railway corporations is necessary to accomplish purposes beyond the reach of individual enterprise, and it will not be denied that they have contributed largely to advance the prosperity of the country. They have enriched and bound far-separated sections together in amicable relations. The growth and development of the resources of our own great State are attributable in a large degree to their agencies. They have become so identified with the institutions of the country, the commerce, trade and business of the people, that they cannot be dispensed with without the most appalling and withering effect upon the vital interests and prosperity of all classes of the community.

On the other hand, they cannot prosper, or even exist, for any great length of time, without the friendship of the people, to whom they look for support, and from whom they obtained their right to exist. How very important, then, that there should be a mutual recognition and acknowledgment of each other's rights, thereby settling for all time to come these differences of opinion that now place these great corporations and their patrons, the people, in antagonism. With the utmost respect for those who entertain a different opinion, we do not share in the belief that any great length of time is needed for the settlement of those questions upon which the people and the corporations are at variance. We have unbounded faith in the people, the law and the courts. With the appliances that they will bring to bear, we look for a speedy settlement of all existing troubles.

General Railroad News.

OLD AND NEW ROADS.

(*Continued from page* 19.)

Central, of New Jersey.

Much has been said lately of large purchases of coal mines and lands by this company, the substance of which appears to be that the Honey Brook Coal Company has purchased a large part of the lands and leases owned by the Lehigh Coal & Navigation Company and has also been consolidated with the Wilkesbarre Coal & Iron Company. The new company, whose name will probably be the Lehigh & Wilkesbarre Coal Company, is owned by parties who are also the largest stockholders in the Central, and its coal property will be tributary to the Central road. The new company owns 25,000 acres of coal lands and leases 8,000 acres more and is said to be negotiating for the lease of the Lehigh Canal and the Delaware Division Canal from the Lehigh Coal & Navigation Company.

Pennsylvania--New York Division.

The new slaughter house at the Harsimus Cove docks is nearly completed. The building and yards, which cover 17 acres, with an extensive dock front, are located entirely upon the docks and made land which are part of the railroad property. The yards have a capacity of 6,000 cattle, and 12,000 cattle and 20,000 sheep can be slaughtered in a week. The company is also building a large house for slaughtering hogs on the south side of the railroad and just west of the Hackensack River, three miles from Jersey City. As soon as these buildings are completed, the bulk of the Pennsylvania stock traffic will come by way of Philadelphia, instead of going, as now, by the Allentown Line to the Communipaw yards.

The old depot in Jersey City is being taken down. Two of the new slips in the ferry house are completed and will be put in use as soon as the depot is down, when the four old slips will be rebuilt to match the new ones.

Milwaukee & St. Paul.

The La Crosse City Council has accepted the agreement made by its committee with the Milwaukee & St. Paul Company, and has ordered an election to be held on the question of issuing $15,000 in bonds to purchase the land required by the agreement. By this agreement the city binds itself to give the right of way through the city and two blocks of land for depot grounds. The railroad company agrees to build a depot and to run a car from it to all trains and also a through car to Chicago from La Crosse on every through train. The proposition says nothing about the bridge question, but from the report of the committee it is evident that all opposition to the location of the bridge above the city is to be withdrawn.

Buffalo Connecting Railroad.

A company is to be organized to build a connecting line through the city of Buffalo to the International Bridge.

Buffalo & Jamestown.

A new survey has been made from Gowanda to Dayton Summit. The new line is five miles, or nearly one-half, shorter than the old line, but requires a grade of 95 feet to the mile.

Towns along the line have promised to raise $335,000 in bonds in case the road is built to Jamestown according to the original intention.

New York Central & Hudson River.

This company has applied to the Rochester Commissioners of Public Works for permission to construct iron bridges over the several streets crossed by the track between the Genesee River and the Erie Canal in that city. This permission is needed to carry out the plan of elevating the freight tracks through the business part of Rochester. The company has purchased a large part of the land required for this purpose.

The Hudson River being again open, freight is being sent down the Athens Branch and from Athens to New York by boat, which is something unprecedented in January.

Missouri, Kansas & Texas.

The bridge over the Missouri River at Boonville, Mo., which was completed January 1, is 1,637 feet long. It has a draw-span 362 feet long, with two openings, each 160 feet clear; two fixed spans 258 feet each, three of 225 feet each and one of 84 feet. The spans are all Post trusses of iron, the trusses of the five long fixed spans being 28 feet high, measuring from center to center of chord pins, and the trusses of the draw-span being 36 feet high at the center and 28 feet at the ends. The trusses are 20 feet apart, making the roadway about 19 feet clear width. The bridge rests on two stone abutments, four stone piers and three pneumatic column piers. These last each consist of three iron cylinders, 8½ feet in diameter, filled with concrete and sunk down to the bed rock and into it two or three feet. Two of these support the bridge, being braced together and filled between with masonry, while the third column is carried up to low water and supports an ice-breaker of masonry. The lower chord of the bridge is 28 feet above ordinary high water and 43 feet above low water. The north pier and north abutment rest on timber platforms supported by piles, the other piers and abutment rest on the rock. The bridge floor is built for highway travel.

There is a dyke about 1,800 feet long across a secondary channel on the north side, which contains about 110,000 cubic yards of embankment, and was built at a cost of about $40,000.

Trains commenced to run over the bridge January 10.

Cairo & Fulton.

The necessary material having been transferred across Red River, tracklaying between Fulton and Texarkana is going on. As soon as the road is finished a train will be put on, transfers across the river at Fulton being made by boat until the bridge can be completed.

It is proposed to build a branch about eight miles long to Washington, Ark.

Iowa Pacific.

A telegram from Dubuque, Ia., reports that $2,600,000 of this company's bonds have been negotiated in Germany, which will insure the laying of track on the road next season. This report is hardly credible, considering the present position of American railroad securities in Germany.

Dividends.

The Housatonic Railroad Company has declared a dividend of $4 per share on the preferred stock, payable January 26.

The Ogdensburg & Lake Champlain Railroad Company paid a semi-annual dividend of 3 per cent. January 8.

Rogersville & Jefferson.

The East Tennessee, Virginia & Georgia Company, which purchased this road from the State of Tennessee in 1871, has sold it to Major W. P. Elliott, reserving a lien upon the superstructure for the purchase money, $25,000. Major Elliott binds himself to continue to operate the road, and has purchased an engine and some cars with the road. The bridge over Holston River needs repairs to the amount of $40,000. The road extends from Rogersville Junction, Tenn., northward to Rogersville, 15¼ miles. It cost the State some $530,000, and was sold for $23,000.

Toledo, Peoria & Warsaw.

The stockholders' committee appointed to investigate the condition of the road has made a report. After considering the condition of the road, its resources and the affairs of the company, the committee recommends that there be an amicable foreclosure of the consolidated mortgage, and a reorganization of the company. The committee's plan comprises a new general mortgage in which all outstanding bonds are to be funded, the funding of coupons due in 1874 and 1875, and the exchange of the present stock for new stock with an assessment on each share, and also the funding of part of the floating debt.

The whole amount of the present funded debt is $6,420,000, and there is also $163,450 of interest-bearing dividend scrip. There is $1,700,000 first preferred, $1,000,000 second preferred, and $3,000,000 common stock—$5,700,000 stock in all. The capital account thus amounts to $12,313,450, or $51,955 per mile, and there is besides a floating debt which amounts to $815,557.

Indianapolis, Bloomington & Western.

The branch of this road from Urbana southwestward, which was originally the Monticello Railroad, and by that company was fully graded from Urbana to Decatur, and by the present owners was ironed last year from Urbana to Monticello, is now extended and working from Monticello southwestward 24 miles to a junction with the main line of the Illinois Central near Decatur. This extension was omitted in our report of construction in 1873.

The Westinghouse Brake Patent.

A Pittsburgh dispatch says: "The controversy long existing between the owners of the Royce and other patents for the storing and transmitting of power by compressed air, and the Westinghouse Air Brake Company, has been closed, the Westinghouse Company having purchased the exclusive right for the air brake and other purposes on railway trains.

Tennessee Central.

Seven miles of the road-bed from Trenton, Tenn., eastward is graded, making, with the nine miles of old road-bed, 16 miles in all. The company expects to have the road from Trenton to Huntingdon, on the Nashville, Chattanooga & St. Louis, 33 miles, ready for the rails by spring.

Vermont Central.

The Vermont Central first-mortgage bondholders have filed a bill in equity in the United States Circuit Court for Vermont against the trustees under the mortgage and also the Central Vermont Company, the present Receiver and Manager. The bondholders ask that the Receiver be restrained from giving precedence to the income and extension bonds, issued in payment of the floating debt, or from enforcing the payment of the same out of the trust funds to the prejudice of the first-mortgage bondholders. There is some question as to the jurisdiction of the Court, which will probably be the first point to be settled.

Owensboro & Russellville.

This company has asked Davidson County, Tenn., to subscribe $250,000 to the stock in aid of the projected extension of the road from Owensboro, Ky., to Nashville.

The name of the company has been changed to Evansville, Owensboro & Nashville.

The road is now 33¼ miles long, from Owensboro south to a junction with the Elizabethtown & Paducah. From that point to Nashville the distance is about 95 miles.

Central Pacific.

The stock of this company has been put on the list at the New York Stock Exchange. The official statement gives the following figures:

Bonded debt, less bonds in sinking fund	$53,411,210 65
United States subsidy bonds	27,855,680 00
Floating debt	3,244,136 60
Total	$84,511,027 25
Capital stock issued	54,275,500 00

The total length of road and branches owned is 1,218.51 miles, with 110.4 miles of second and side track.

Chesapeake & Ohio.

The first-mortgage bonds have been put on the New York York Stock Exchange list. The official statement contains the following figures:

Virginia Central bonds outstanding	$1,318,000 00
First-mortgage bonds	15,000,000 00
Total	$16,318,000 00
Capital stock issued	15,852,087 52

Meetings.

The annual meeting of the Paducah & Memphis Railroad Company will be held in Paducah, Ky., January 21.

St. Louis Connecting Railroad.

This company has applied to the St. Louis City Council for the necessary authority to lay its tracks through the city. The road is intended to connect the lines entering St. Louis from the west with the levee and the approaches to the bridge.

Vermont & Canada.

This company has filed in the Franklin County (Vt.) Court a petition setting forth that the accounts filed by the Vermont Central trustees are incomplete and incorrect, and asking that the trustees be summoned to show cause why they should not make a fuller report, and also that disinterested persons may be appointed to examine and report on the accounts.

Shenandoah Valley & Ohio.

Ground was broken for this road at Franklin, West Va., January 6. The contract is let from Franklin east to the Shenandoah Mountain, and from that point to the crossing of the Valley road it will be let early in the spring.

St. Paul & Pacific.

Minnesota papers state that Mr. Farley, the Receiver, recommends that the road should be extended from the present terminus at Melrose, Minn., northwest to Alexandria, about 30 miles, and that Alexandria should be made the permanent terminus. He also recommends that the line from Glyndon north be connected with the main line at Breckenridge by building from Glyndon southward up the Red River valley, as has been proposed.

A passenger train has been put on the line from Glyndon north to Crookston, making one trip a week each way.

Union Freight Railroad.

This line, which is a street railroad for freight purposes connecting the lines entering Boston from the south with the wharves of the city, will hereafter be operated by the Old Colony Railroad Company, and will be under the charge of the freight department of that road.

Cincinnati Southern.

The time for receiving proposals for the grading of the 80 miles of road from South Danville, Ky., to the Tennessee line is extended to January 26.

New London Northern.

This company asks proposals for the construction of a wharf 150 feet wide and 1,125 feet long in New London Harbor. Bids will be received for the whole work or separate bids may be made for dredging; masonry, timber and iron work; and earth filling. Plans may be seen and bids will be received at the Treasurer's office in New London, Conn., until January 30.

Sherbrooke, Eastern Townships & Kennebec.

The town of Inverness, Quebec, has voted a bonus of $30,000 in aid of this road.

Indianapolis, Bloomington & Western.

A convention of the Illinois stockholders is to be held, to consider the charges made against the management of the company and its present condition.

Lewiston & Rumford Falls.

The Maine Legislature is asked to charter a company to build a railroad from Lewiston, Me., northwest to Rumford Falls, a distance of about 35 miles.

Cincinnati, Sandusky & Cleveland.

Suit has been brought against Rush R. Sloane, formerly President of the company, to recover $50,000, said to have been received by him while an officer of the company.

Mississippi Valley & Western.

The bonds issued to this company by Canton, Mo., the amount of which was $25,000, have been canceled, the company not having complied with the contract.

Orange, Jasper & Shelby.

This company, whose road is to connect with the Shreveport & Southwestern, has been organized and $100,000 subscribed to the stock. The company intends to ask the Texas Legislature to amend the charter so as to allow the adoption of the same gauge as the Louisiana road.

Utica, Clinton & Binghamton.

It is stated that the New York & Oswego Midland Company has failed to pay the rent due. If payment is not made within 60 days the Delaware & Hudson Canal Company, which guaranteed the lease, will be called upon to pay.

Cairo & St. Louis.

A meeting of the directors was held in St. Louis, January 6. After hearing a statement from the contractors, H. R. Payson & Co., the time for the completion of the road to Cairo was extended to July 1, 1874.

Davenport & St. Paul.

It is reported that the bondholders intend to commence legal proceedings to compel the construction company, which is building the road, to show what disposition has been made of the funds realized from the sale of the bonds. The bonds